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The Assessment of Innovation Capital Disclosure in Global Airline Companies

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Abstract
Purpose: This study aims to investigate the innovation capital disclosure in annual reports of global airlines during a three-year period 2017 to 2019.
Design/methodology/approach: A three-dimensional index that includes internal, external, and human capital is used to examine innovation capital content of 36 global airlines.
Findings: The study finds that each annual report includes a minimum of three and an average score of 59.27 on the innovation capital. Internal capital category has the greatest level of disclosure quality in annual reports, followed by external capital and human capital categories.
Research limitations/implications: Analysing the categories and disclosure quality of the innovation capital can help an airline determine its goals and make strategic decisions for value creation.
Practical implications: Strengthen the strategy to improve the disclosure of innovation capital in order to boost airlines' perceived innovativeness
Originality/value: To the best of our knowledge, there are limited studies on innovation capital disclosure in global airline industry.
Paper type: Research paper

Keywords: Innovation capital, Airline, Disclosure

Introduction

The airline industry is critical to the rise of globalisation and, through tourism and trade, makes a significant contribution to global economic growth. The global airline industry encompasses air transport service providers of passenger and cargo. In 2018, the global airline industry moved $6.7 trillion in commodities to markets all over the world, serving over 4 billion passengers. Globally, the industry supported 65 million employees and created $2.7 trillion in gross domestic product (IATA, 2019). Despite its rapid growth, the airline industry has seen a lot of transformations in the last 30 years. Deregulation, severe competition, rising fuel costs, technological change, digitalisation, overcapacity, labour unrest, catastrophic occurrences, infectious disease outbreaks, and the rise of low-cost carriers are all factors causing the industry to struggle to keep up. As a result, achieving a sustainable competitive edge has proven challenging for the airline industry. Many airlines are running with little earnings, despite the fact that some have already collapsed and merged (IATA, 2018). In 2020, the global airline industry has been shocked by the Covid-19 pandemic. Passenger traffic was down 94% year on year, and over two-thirds of the world's commercial aircraft were grounded, resulting in a

66 percent decline in global revenue passenger kilometres due to travel restrictions (IATA, 2020).

As a result of the harsh climate in which the airline industry operates, more airlines are focusing on innovation in order to improve their competitive position (Franke, 2007). In a highly competitive and global economy, innovation is commonly recognised as a crucial means of achieving sustainability (Adams et al., 2016; Kuzma et al., 2020; Michelino et al., 2019). According to Baregheh et al. (2009), innovation is described as the transformation of organisation ideas into new/improved processes, services or products with the purpose of competing, advancing and differentiating themselves in the marketplace. Innovation is no longer an option in the pursuit for economic, social, and environmental sustainability; it is instead a must for organisational success. Regular cost-cutting activities and efforts to establish competitive operating platforms are clearly insufficient to provide a lasting competitive advantage. As a result, it is critical that airlines develop creative tactics aimed at improving performance, such as new business models, efficiency improvements through technological innovation, and innovative business practises that lead to market segment reshaping.

Given the importance of innovation capital to the airline industry, there is a greater need to understand the various types of innovation capital, as this could provide information on challenges and concerns that is simple to comprehend and implement. However, there is a dearth of studies specifically addressing various forms of intellectual capital such as innovation capital (Bellora and Guenther, 2013). The prior work on voluntary disclosure has mostly concentrated on intellectual capital in general, providing a comprehensive knowledge of intellectual capital disclosure (Guthrie, Ricceri, & Dumay, 2012). In order to provide insights to help managers reinforce innovation in their organisations, a complete assessment of the current state of innovation capital within the airline industry is required. Despite the fact that there have been multiple research on intellectual capital in the industry (e.g., Hamzah & Mohamed, 2010), there have been limited studies on innovation capital to the best of the authors' knowledge. This exclusion contrasts sharply with Lev's (2001) assertion that innovation is a driver of corporate value. Furthermore, assessing the impact of innovation capital assets on company performance requires a thorough understanding of how to measure it (Kaplan & Norton, 1996). This emphasises the need of gathering data on innovation capital to aid in decision-making that can improve outcomes. As a result, this study fills in the gap by measuring an innovation capital index for a group of global airlines.

The rest of the paper is laid out as follows. The literature on airline performance and innovation capital is discussed in Section 2. Section 3 describes the sample and methodology utilised in the study. The study findings are presented in Section 4, and Section 5 concludes the study.

Literature Review

The airline industry is genuinely international and fiercely competitive. As a result, airlines are more need to move quickly in order to remain competitive. Innovation and technical development, according to Deng et al. (1999), are the primary drivers of company productivity and growth. The airline business has seen challenges connected to innovation in the last decade, attracting increased attention from policymakers and decision makers, and the future decade is likely to be much more chaotic. The airline industry will be shaped in the coming years by factors such as a fresh wave of technological development, volatile fuel prices, improvements in big data, predictive analytics, and artificial intelligence (IATA, 2018), all of which will increase the importance of innovation capital. Indeed, according to the OECD (2010), traditional growth drivers, such as tangible asset investment, are dwindling in importance and being replaced by innovation capital.

Innovation capital is a subset of a business's intellectual capital that refers to the capacity of a firm to develop and employ creative ideas, as well as the associated outcomes from intellectual properties and other intangible, tangible and financial assets (Edvinsson & Malone, 1997). According to economists, innovation capital refers to any activity or decision that arises from the discovery of a problem via R&D and the commercialisation process (Duran et al., 2014; Rogers, 2003). Additionally, innovations have a distinct purpose within the intellectual capital nexus (Lev, 2001). For instance, internal capital (e.g. patents) become important to business when they are leveraged to develop innovative products by human capital (e.g. employees). Human capital (e.g. employee education and training) is necessary for the effective development of innovation practices. Establishing external capital (e.g. a network of collaboration and experience exchange with other businesses) is a precondition for acquiring the information required for innovation development (Mouritsen, Bukh, & Bang, 2008). This implies that innovation capital is the outcome of an increased emphasis on various intellectual capital categories such as internal, external or human capital. Moreover, the practicability of innovation capital in real life practice can be demonstrated by Emirates. While preparing an aircraft for departure, Emirates' operational personnel uses a unique application called Hub Monitor (internal capital) to share and monitor real-time information. To improve passenger experience, the programme prevents aircraft delays and enhances on-time performance. This scenario exemplifies the necessity of innovation capital in gaining a competitive advantage (Bowen et al., 2010). Overall, innovation capital is a collection of many sorts of organisational resources employed in the creation and commercialisation of new knowledge (Fagerberg, 2009).

Since the pioneering work of Franke (2007), which looked at innovation as a crucial driver for airlines seeking to gain a competitive advantage, innovation has been a prominent item on the research agenda for airlines. Airlines' continued profitability has been aided by innovation, which has allowed them to keep ahead of the competition and raise their market value (Bowen et al., 2010; Nicolau & Santa-María, 2012a, 2012b). Kuzma et al. (2020) discovered a significant positive association between innovation and organisational sustainability performance. Furthermore, the finding demonstrates that innovation-oriented processes enable businesses to embrace new opportunities in order to meet changing market and customer expectations (Baregheh et al., 2009).

According to Franke (2007) and Fagerberg (2009), innovation capital is a major component in understanding airline outperformers and underperformers. Airlines that show they can create and implement new ideas would generally outperform their less capable competitors. Therefore, it is crucial to understand how the airline industry uses innovation capital to gain a competitive advantage. Relevant disclosure is of interest to both airline industry leaders and policymakers, given the growing importance of innovation capital. Considering that mandatory disclosure (e.g. International Financial Reporting Standards) for intangibles (including innovation capital) is limited, voluntary disclosure of innovation capital would be more relevant by giving additional information to aid users in making economic decisions. Organisations use voluntary disclosure to minimise information asymmetry between managers and investors (Healy & Palepu, 2001) by providing innovation capital information.

The best proxy for measuring the innovation-oriented practises reported by airlines in annual reports, which should be captured by quantitative and qualitative metrics, is a disclosure index. A disclosure index with multidimensional categories can be used to do a quantitative content analysis of disclosure documents. This index is then used to create a benchmark for airlines by assessing the subcategories of each airline's innovation capital in the three categories, namely internal, external, and human capital. Analysing the innovation capital index categories and quality can assist an airline in determining its goals and making strategic decisions for future

value creation. The study focuses on innovation capital as a type of intellectual capital and lays the groundwork for further investigation of other types of intellectual capital in the intellectual capital nexus.

Methodology

Sample and data

The study sample consists of the top 100 airlines based on the Skytrax World Airline Awards in 2018. The study focuses mostly on information available to third parties, therefore, annual reports were chosen based on public accessibility. Due to the widespread distribution and availability of annual reports (Haji & Mohd Ghazali, 2012; Yi & Davey, 2010) as the primary medium for communicating information (including innovation) (Elfeky, 2017) and the growing importance of innovation for achieving competitive advantages (Bellora & Guenther, 2013; Buenechea-Elberdin, 2017; Kuzma et al., 2020), it is reasonable to assume that annual reports will continue to be used. To meet this condition, each airline in the sample had to have 2017-2019 annual reports in English language. The reason for selecting the sample year is because it provides the latest information at the time of data collection. To eliminate data redundancy, only airline holding companies are included in the sample. After rejecting 45 airlines with incomplete or missing annual reports, four airlines whose annual reports are not in English, and 15 airline subsidiaries/joint ventures, this selection technique gave a final sample of 36 airlines, as in Table 1. Therefore, the total observation for the study is 108 (36 airlines x 3 years) annual reports.

Table 1: Summary of Sample Selection

Top 100 airlines		100
Incomplete/missing annual reports	(45)	
Annual reports not in English	(4)	
Subsidiaries/joint ventures of airlines	(15)	64
Final sample		36
Total observation 2017-2019		108

Content analysis

Content analysis is a research tool that analyses and quantifies the frequency with which each theme appears in text to codify it into unique themes (Krippendorff, 2012). It is frequently used in voluntary disclosure studies, such as those looking into innovation capital reporting (Bellora & Guenther, 2013), intellectual capital reporting (Abeysekera & Guthrie, 2005; Bozzolan et al., 2003; Campbell & Rahman, 2010), human capital reporting (Bednarova et al., 2017; Pisano et al., 2017), social and environmental reporting (Guthrie & Abeysekera, 2006) and corporate social reporting (Campopiano & De Massis, 2015; Gao, 2011).

Subsequently, content analysis is used to analyse the innovation capital disclosure in each airline's annual reports. Every component of the annual reports is meticulously examined for any information on innovation capital. To increase validity, this study uses the Bellora and Guenther (2013) index rather than creating a new innovation capital index. A quantitative content analysis is conducted on airlines annual reports using a three-dimensional innovation capital index that includes internal, external, and human capital. Table 2 summarises the innovation capital index categories and definition.

The frequencies of innovation capital subcategory are disclosed in each yearly report is determined using disclosure frequency analysis (e.g., Beattie & Thomson, 2007; Striukova et al., 2008). Because the current study entails analysing and comparing annual reports from different organisations, this method is practical (Beattie & Thomson, 2007). In addition, Beattie

and Jones (2001) claimed that disclosure redundancy is a method utilised in annual reports to communicate management's importance of the revealed information. A four-point scoring approach was used to assess disclosure quality, similar to that used by Guthrie et al. (1999), Bozzolan et al. (2003), Schneider and Samkin (2008), and Haji and Mohd Ghazali (2012). In the absence of information, a score of 0 is assigned; for a narrative item, a score of 1 is assigned; for a numerical item, a score of 2 is allocated; and for a financial item, a score of 3 is issued. The research is based on Krippendorff's (2012) reliability assessment. Ten annual reports were used to create and verify a set of coding guidelines. Following that, any ambiguous coding standards were checked and corrected.

Table 2: Categories of the Innovation Capital Index and Its Definitions

Category and Subcategory	Definition
1. Internal Capital	
1.1 Intellectual Property	Legal protections. i.e. patent and copyright protections that safeguard the company's innovation.
1.2 Management Philosophy	General beliefs regarding the importance of innovation to a business, typically expressed in vision or mission statements.
1.3 Corporate Culture	A collection of shared behaviours and attitudes established by a business in order to foster innovation: code of conduct/practices, operating principles.
1.4 Management Process	The functional structure, processes, and organisational practises that the business use to support its innovative efforts.
1.5 Information and Networking System	The network of all communication channels inside an organisation that is utilised to encourage innovation.
1.6 Infrastructure	Commitment of resources by the corporation to innovation efforts: business initiatives, research and development, and investment in innovation.
2. External Capital	
2.1 Customers and Market	Customer engagement and response to innovations, innovations produced in collaboration with customers, and the financial effect of innovations in terms of revenue, returns, market share, and cost savings.
2.2 Distribution Channels	The process through which a company's innovation is marketed and distributed: promotional campaigns/advertising, sales, and distribution.
2.3 Firm Reputation	Credit is attributed to the company's innovative efforts: awards, CSR initiatives, and brand promotion.
2.4 Business Collaborations	Relationships between a business and individuals or organisations that are defined by reciprocal cooperation in the pursuit of innovation.
3. Human Capital	
3.1 Employees	Employees engaged in innovative efforts.
3.2 Education	Education level is deemed critical for the generation of successful ideas.
3.3 Training	Measures done to impart the abilities deemed necessary for successful innovation.

3.4 Work-Related Knowledge	Competencies, qualities, and experience that are seen to be crucial for success.
3.5 Innovativeness of Employees	Employee-generated innovations in the form of new ideas, new products, new series, new procedures, and associated scientific papers.

Source: Bellora and Guenther (2013)

Results

Table 3 presents the descriptive statistics for innovation capital score during a three-year period from 2017 to 2019. The mean scores gradually decrease from 66.13 percent in 2017, 56.53 percent in 2018, to 55.13 percent in the year 2019, suggest that most airlines are hesitant to include information on innovation capital in their annual reports.

Table 3: Descriptive Statistics for Innovation Capital Score

Year	Score	Mean	Std Dev	Min	Max
2017	992	66.13	71.18	0	212
2018	848	56.53	48.06	0	139
2019	827	55.13	48.61	0	143
Overall	2667	59.27	55.95	0	212

Table 4 displays the breakdown of each innovation capital category disclosed in the airlines' annual report. Overall, the mean disclosure for innovation capital disclosure categories is moderately low. The largest proportion of these categories appears to be the internal capital category (41.4 percent), followed by the external capital category (36.6 percent) and the human capital category (22 percent).

Table 4: Innovation Capital Score by Category

Category	2017		2018		2019		Overall	
	Score	%	Score	%	Score	%	Score	%
Internal Capital	350	42.3	339	40.0	414	41.7	1103	41.4
External Capital	291	35.2	323	38.1	363	36.6	977	36.6
Human Capital	186	22.5	186	21.9	215	21.7	587	22.0
Total	827	100	848	100	992	100	2667	100

For the subcategories, in Table 5, the most frequently disclosed subcategory is training, information and networking system, firm reputation and business collaborations. The lowest priority subcategories include innovativeness of employees, work-related knowledge, intellectual property and education.

Table 5: Innovation Capital Score and Ranking by Subcategory

Category and subcategory	2017		2018		2019	
	Score	Rank	Score	Rank	Score	Rank
Internal Capital						
1.1 Intellectual Property	6	13	2	14	1	14
1.2 Management Philosophy	54	8	35	9	43	8
1.3 Corporate Culture	7	10	19	11	13	11
1.4 Management Process	56	7	84	5	73	6
1.5 Information and Networking System	212	1	139	1	134	2
1.6 Infrastructure	79	5	60	7	86	5
External Capital						
2.1 Customers and Market	1	14	23	10	30	10
2.2 Distribution Channels	119	4	82	6	63	7
2.3 Firm Reputation	178	2	114	3	102	3
2.4 Business Collaborations	65	6	104	4	96	4
Human Capital						
3.1 Employees	34	9	49	8	31	9
3.2 Education	0	15	0	15	0	15
3.3 Training	167	3	123	2	143	1
3.4 Work-related Knowledge	7	10	10	12	4	13
3.5 Innovativeness of employees	7	10	4	13	8	12

Table 6 presents the detailed scores and rankings for each airline. The rankings of top 10 airlines are almost identical, or if any, considered small. Airlines such as KLM Royal Dutch Airlines, Turkish Airlines, EasyJet, AirAsia, SriLankan Airlines are among the companies that have marginally higher disclosure of innovation capital, while Southwest Airlines, Thai Airways, Qantas Airways, Air New Zealand, Virgin Australia, Air Transat are those airlines with least disclosure of innovation capital.

Table 6: Innovation Capital Score and Ranking by Airline

	2017		2018		2019	
Airlines	Score	Rank	Score	Rank	Score	Rank
Singapore Airlines	34	9	25	10	28	6
Qatar Airways	12	31	16	26	22	18
ANA All Nippon Airways	18	23	30	6	23	16
Emirates	35	8	26	8	19	22
EVA Air	19	20	14	27	15	26
Cathay Pacific Airways	23	16	12	30	13	30
Lufthansa	16	25	26	8	26	10
Garuda Indonesia	39	6	20	23	17	24
Thai Airways	29	12	13	29	11	31
Qantas Airways	5	35	7	33	7	33

Japan Airlines	16	25	22	22	19	22
China Southern Airlines	40	4	24	16	20	20
Air New Zealand	6	34	7	33	7	33
Turkish Airlines	54	1	42	1	38	2
KLM Royal Dutch Airlines	39	6	42	1	45	1
Bangkok Airways	20	18	11	31	16	25
Virgin Australia	3	36	6	35	6	35
Aeroflot	27	13	25	10	26	10
Finnair	25	14	25	10	24	14
AirAsia	42	3	25	10	35	4
Norwegian	16	25	18	25	20	20
China Airlines	20	18	23	19	15	26
Alaska Airlines	18	23	24	16	15	26
Aegean Airlines	14	28	23	19	25	12
JetBlue Airways	32	10	30	6	28	6
EasyJet	30	11	34	3	37	3
AirAsiaX	19	20	23	19	24	14
Air Astana	43	2	32	4	27	9
Vietnam Airlines	14	28	25	10	23	16
IndiGo	13	30	19	24	22	18
Southwest Airlines	12	31	9	32	11	31
Copa Airlines	19	20	14	27	15	26
Air Transat	7	33	2	36	3	36
Air Mauritius	23	16	25	10	28	6
TUI Airways	24	15	24	16	25	12
SriLankan Airlines	40	4	32	4	30	5

Discussions and Conclusion

Prior study on innovation capital disclosure has been lacking, which contrasts with the micro- and macroeconomic relevance of innovation. This study examines the quality of innovation capital disclosure in 36 global airline annual reports as a means of disclosing information regarding innovation capital from 2017 to 2019.

The study observes that each annual report includes a minimum of three and an average score of 59.27 on the innovation capital. In general, the benefits of innovation capital disclosure in annual reports appear to outweigh the costs. This conclusion can be strengthened by examining the annual report's coverage of the three innovation capital disclosure categories. Internal capital category has the greatest level of disclosure quality in annual reports, followed by external capital and human capital categories. The evidence supports the premise that investments in all forms of intellectual capital generate innovation (Lev, 2001). These intellectual capital categories are strongly interconnected, forming a network that supports innovation and value creation (Mouritsen et al., 2008).

Limitations and Suggestions for Future Research

The research has several limitations. First, the study's generalisability is confined to global airlines' innovation capital disclosure. However, our findings offer directions for further

research into innovation capital disclosure and other forms of document by researchers. Further limitations are related to the study's methodology. The index utilised could be questioned (e.g. concerning the weightings of the quality score). Nonetheless, rather than developing our own, unique disclosure index, we chose to depend on index that had previously been found to be useful in previous disclosure research and so had already been validated.

Theoretical Implications

Despite these limitations, the study contributes in a variety of ways. We demonstrate that annual reports are utilised to convey information about innovation capital, averaging 59.27 score per annual report. This demonstrates that firms that publish annual reports are able to accomplish one of Mouritsen et al.'s (2001) primary objectives, namely to showcase innovation initiatives. As with other disclosures, the nature of the disclosure remains predominantly qualitative, limiting the annual report's potential. Fear of incurring proprietary costs may discourage businesses from making quantitative, verified disclosures. Simultaneously, qualitative texts enable the explanation of how a corporation achieves its innovativeness aims. Second, we observe that innovation capital disclosure in annual reports is mostly comprised of items linked to internal capital, followed by external capital and human capital. As a result, we demonstrate how innovation capital is related to various forms of intellectual capital and give quantitative indicators that innovations can be developed by expanding the firm's available intellectual capital categories.

Practical and Social Implications

Additionally, the findings have policy and practice implications. To begin, large enterprises, in particular, may view annual reports as appropriate instruments for addressing the demand for innovation capital disclosure, as evidenced by the sample annual reports' overall use of innovation capital disclosure subcategories. Second, policymakers may gain insight into present innovation capital disclosure procedures and identify strategies to further strengthen policymaking. For instance, airline policymakers may recognise the need for measuring and reporting innovation capital information in order to boost their company's perceived innovativeness. Finally, policymakers may recognise that additional efforts are necessary to meet the requirement for uniformity in disclosure norms and behaviour.

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