ISTANBUL BILGI UNIVERSITY
INSTITUTE OF GRADUATE PROGRAMS
INTERNATIONAL FINANCE MASTER'S DEGREE PROGRAM

COMPARING INTELLECTUAL CAPITAL EFFICIENCY OF INTERNATIONAL FINANCIAL INSTITUTIONS

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ISTANBUL
2020

Comparing Intellectual Capital Efficiency of International Financial Institutions

Uluslararası Finansal Kuruluşların Entelektüel Sermaye Verimliliklerinin Karşılaştırılması

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Tezin Onaylandığı Tarih : /06/2020
Toplam Sayfa Sayısı: 50

Anahtar Kelimeler (Türkçe)	Anahtar Kelimeler (İngilizce)
1) Entelektüel sermaye verimliliği	1) Intellectual capital efficiency
2) Entelektüel katma değer katsayısı	2) Value added intellectual coefficient
3) Uluslararası finansal kuruluşlar	3) International financial institutions
4) T-testi	4) T-test
5) ANOVA	5) ANOVA

ACKHOWLEDGEMENTS

First, I would like to thank my father Prof. Dr. Bülent Celasun, who tirelessly read many drafts and pointed me towards the right direction, and without his help and motivation, I simply would not be able to complete this study.

Furthermore, I would like to express my gratitude to my supervisor, Prof. Dr. Cenktan Özyıldırım for his lectures and invaluable assistance with this analysis.

I would also like to thank all of the lecturers at Istanbul Bilgi University that I am privileged to be taught by.

Finally, I am extremely lucky to have studied at TOBB University of Economics and Technology during my undergraduate studies, which clearly contributed a lot to this study.

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LIST OF ABBREVIATIONS

ADB: Asian Development Bank

AfDB: African Development Bank

AIIB: Asian Infrastructure Investment Bank

BADEA: Arab Bank for Economic Development in Africa

BIST: Istanbul Stock Exchange

BOAD: West African Development Bank

BRICS: Brazil, Russia, India, China and South Africa

BSTDB: Black Sea Trade and Development Bank

BWO: Bretton Woods Organization

CABEI: Central American Bank for Economic Integration

CAF: Development Bank of Latin America

CDB: Caribbean Development Bank

CEB: Council of Europe Development Bank

CEE: Capital Employed Efficiency

COMECON: Council for Mutual Economic Assistance

D&A: Depreciation and Amortisation

EADB: East African Development Bank

EBRD: European Bank for Reconstruction and Development

EC: Employee Cost

EDB: Eurasian Development Bank

EIB: European Investment Bank

EU: European Union

FDI: Foreign Direct Investment

HC: Human Capital

HCE: Human Capital Efficiency

HCE: Human Capital Efficiency

IADB: Inter-American Development Bank

IBRD: International Bank for Reconstruction and Development

ICE: Intellectual Capital Efficiency

IFAD: International Fund for Agricultural Development

IFC: International Finance Corporation

IFI: International Financial Institution

IIB: International Investment Bank

IMF: International Monetary Fund

IsDB: Islamic Development Bank

ITO: International Trade Organization

NDB: New Development Bank

NFG: Nordic Finance Group

NIB: Nordic Investment Bank

OFID: OPEC Fund for International Development

OIC: Organisation of Islamic Cooperation

OP: Operating Profit

OPEC: Organization of the Petroleum Exporting Countries

ROA: Return on Assets

SC: Structural Capital

SCE: Structural Capital Efficiency

UN: United Nations

USA: United States of America

USSR: Union of Soviet Socialist Republics

VA: Value Added

VAIC™: Value Added Intellectual Coefficient

WB: World Bank

WBG: World Bank Group

WTO: World Trade Organization

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ABSTRACT

Comparing Intellectual Capital Efficiency of International Financial Institutions

The "basic economic problem" of satisfying infinite needs with finite resources requires efficiency by its nature. Although international financial institutions (IFIs) are exempt from national taxes in most cases, they are not exempt from the basic economic problem. Hence, their efficiency requires attention. Measuring the efficiency of tangible assets (such as invested capital, owned lands etc.) has been done using specific ratios and analyses for many years. However, the efficiency of intangible assets (such as knowledge, institutional culture etc.) is more difficult to measure and its importance has been growing significantly in the recent years.

This study analyses the relationship between IFIs' shareholder diversity and their intellectual capital efficiencies (ICE) based on Value Added Intellectual Coefficient (VAIC^{TM}) calculations. In the analysis, for the sake of simplicity, number of shareholders represents diversity. All of the 23 currently operational IFIs, which were separated into three groups based on their number of shareholders, were included in the analysis and for each of them VAIC^{TM} was calculated for the past three years, resulting in a dataset of 69 observations. This dataset was analysed using ANOVA (for three groups together) and T-tests (for each pair of groups).

The results of the ANOVA and T-tests showed that groups' means are different from each other; hence, the ICE was found to be related with the number of members. Furthermore, the VAIC^{TM} observations indicate a negative correlation between intellectual capital efficiency and diversity. This admittedly unexpected result invites a closer look at the notion of diversity and intellectual capital as assessed by VAIC^{TM}.

Key words: Intellectual capital efficiency, value added intellectual coefficient, International financial institutions, T-test, ANOVA.

ÖZET

Uluslararası Finansal Kuruluşların Entelektüel Sermaye Verimliliklerinin Karşılaştırılması

Sınırlı kaynaklarla sınırsız ihtiyaçların karşılanması gerçeğinden doğan "temel ekonomi sorunsalı", verimliliği gerekli kılar. Uluslararası finansal kuruluşlar (UFK), her ne kadar milli vergilerden muaf olsalar da, temel ekonomi sorunsalından muaf değillerdir. Bu nedenle UFK'lerin de verimliliğine bakılmalıdır. Somut varlıkların (yatırılan sermaye, sahip olunan taşınmazlar vb.) verimliliğinin ölçülmesi yıllardır belli rasyolar ve incelemeler ile yapılmaktadır. Öte yandan, soyut varlıkların (bilgi birikimi, kurum kültürü vb.) verimliliğinin ölçülmesi daha zordur ve bunlar son yıllarda daha fazla önem kazanmıştır.

Bu çalışma UFK'lerin ortaklık yapılarındaki çeşitlilik ile entelektüel sermaye verimlilikleri (ESV) arasındaki ilişkiyi, entelektüel katma değer katsayısı (EKDK) hesaplamalarını kullanarak incelemektedir. Sadelik amacıyla, çeşitlilik UFK'lerin üye sayıları ile sınırlı tutulmuştur. Çalışmanın yapıldığı tarihte işlevsel olan 23 UFK'nin tamamı, üye sayılarına göre üç gruba ayrılarak, incelemeye konu edilmiş; her bir UFK'nin son üç yıl için EKDK'leri hesaplanmış ve 69 gözlemden oluşan bir veri seti elde edilmiştir. Bu veri seti ANOVA (üç grup için birlikte) ve T-testi (her bir ikili grup için ayrı ayrı) kullanılarak incelenmiştir.

ANOVA ve T-testi sonuçları grupların ortalamalarının birbirlerinden farklı olduğunu göstermiş ve ESV ile üye sayısının ilişkili bulunmuştur. Ayrıca EKDK gözlemleri, entelektüel sermaye verimliliği ile çeşitlilik arasında ters ilinti olduğunu ortaya koymuştur. Bu gerçekten beklenmedik sonuç, çeşitlilik ve EKDK ile ölçülen entelektüel sermaye kavramlarının daha yakından incelenmesini gerektirmektedir.

Anahtar Kelimeler: Entelektüel sermaye verimliliği, entelektüel katma değer katsayısı, uluslararası finansal kuruluşlar, T-testi, ANOVA.

INTRODUCTION

While the first institutional international organizations date back to the 19th century (i.e. International Telegraphic Union, 1865), the emergence of international financial institutions (IFIs) is relatively new. After the World War II, the victorious allies established – what is known as – the Bretton Woods Institutions. Led by the United States of America (USA), 43 countries formed the World Bank (WB) and the International Monetary Fund (IMF) in order to i) finance redevelopment of the war torn world and ii) promote international economic integration (Ray, 1998). Over the decades, various IFIs, based on different political agendas and overlapping geographical coverage have been established in different parts of the World with certain member countries. Driven by the core, limited sources principle of economy (Colander, 2008), countries are obliged to assess the effectiveness (or efficiency) of the capital that they invest in these IFIs. This pressing need drew much academic attention, which resulted in a large number of studies.

Searching for the driving forces of efficiency, scholars around the World examined what is called the "invested capital" (combined value of equity and debt capital raised) and then they argued that the nominal financial capital cannot be the only component, as there was also human (or intellectual) capital. Broadly corresponding to the sum of the experience and skills that the employees have, the human capital poses an economic value and it is an off-balance sheet intangible asset.

Although the term diversity as we use it today made its first appearance in 1978 in a US Supreme Court decision (Unversity of California Regents v. Bakke, 1978), it became popular only in 1990s and emerged as a widely accepted value of contemporary liberalism. Since then many academic studies showed that institutions benefit from a diverse employee base, which enriches their human capital. In this study, for the sake of simplicity, diversity is treated as a numeric measure; meaning IFIs with a larger number of members assumed to be more diverse compared to the rest.

In this context, this study aims to explore possible relations between human capital and financial performance of IFIs. For this purpose, all of the currently operational 23 IFIs with different shareholder structures and mandates were analysed. As an index for comparison, Pulic's Value Added Intellectual Coefficient (VAIC^{TM}) model is utilized and a T-test is conducted in order to demonstrate correlation. Although challenged by some recent studies (Ståhle, Aho, & Ståhle, 2011), the VAIC^{TM} model has been widely used for measuring intellectual/human capital efficiency and this paper only aims to benefit from it as an index that allows comparison rather than considering it a measuring model.

The results of the ANOVA and T-tests and Regression analysis show that the hypothesis of this study, that the IFIs with a more diverse background perform better and they should have a higher VAIC^{TM}, is wrong. The statistical methods indicates a negative correlation between the number of IFIs' members and their intellectual capital efficiency.

CHAPTER I

1.1. LITERATURE REVIEW

In general, efficiency is defined as "achieving a goal as cheaply as possible" and most of the time this is linked with Adam Smith's Invisible Hand Theory (Colander, 2008). Unsurprisingly, financial institutions' efficiency has been a discussion topic for academia (Harker & Zenios, 2000), (Berger, Hunter, & Timme, 1993) mainly due to their direct effect on economic growth and their importance as key parties for a functioning financial system. As economic liberalisation increases competition in financial markets, efficiency becomes an increasingly more important subject for financial institutions (Denizer, Dinc, & Tarimcilar, 2000). The efficiency of international financial institutions (IFIs) needs to be analysed systematically since by definition IFIs are institutions that have more than one founder counterparty, which necessitates mediating between financial return and political agendas. Under this perspective, the efficiency of IFIs requires greater emphasis due to their wider reach and multinational capital structure.

In their study, Berger, Hunter and Timme analysed the efficiency of banks with various asset sizes using scale and scope efficiency methods. They have found that the academia has failed to keep pace with the rapidly evolving environment of financial institutions let alone measuring their efficiencies properly (Berger, Hunter, & Timme, 1993).

Harker and Zenios studied on the driving forces behind FIs' efficiency in their study "Performance of Financial Institutions" and they argued that as one of the most significant sectors in the contemporary economics, the performance analysis of financial services is indeed a subject of great importance, which requires more than classical scale and scope efficiency analyses. Harker and Zenios add other factors such as innovation and technology, and management of human resources as measures of efficiency (Harker & Zenios, 2000).

In 1996, the OECD defined the contemporary economic structure as "knowledge economy" in which knowledge (with its utilisation, production and distribution) is the main driving force behind growth, employment and wealth creation in all sectors. Furthermore, a World Bank study in 1998 emphasised the significance of intellectual ability and knowledge for national and global economic advancement.

Subsequently, the academia followed OECD's and World Bank's lead and a large number of studies on intellectual capital and intellectual capital efficiency (ICE) were published. Moreover, an internationally renowned journal[1], Journal of Intellectual Capital made its debut in 2000 become a central source for IC studies. Although there are many studies on analysis of financial institutions' efficiency, ICE as a significant contributor to operational efficiency has not been analysed in detail.

A large number of post-millennium studies on ICE suggest that, as a component of overall institutional efficiency, it has been gaining more importance for all companies as well as for IFIs. Given its intangible nature, intellectual capital is rather difficult to analyse, which makes studies on ICE even harder. Literature on ICE's definition is rich (Mayo, 2001), (Lev, 2001), (Ahonen & Hussi, 2022), and a consensus on its components prevails. These are i) human capital (HC) and ii) structural capital (SC) (Petty & Guthrie, 2000), (Kujansivu, 2005)

The majority of the existing studies on ICE use Value Added Intellectual Coefficient (VAIC™), which was first suggested by Ante Pulic in 1993 (Pulic, Intellectual capital-does it create or destroy value?, 2004) as a method measuring the correlation between intellectual capital and efficiency of companies. Pulic further studied VAIC™ in his following researches (Pulic, Measuring the Performance of Intellectual Potential in Knowledge Economy, 1998), (Pulic, VAIC – an accounting tool for IC management, 2000).

[1] Journal of Intellectual Capital is ranked in Australian Business Deans Council (ABDC) Quality Journal List, The Publication Forum (Finland), VHB-JOURQUAL 3 (Germany), BFI (Denmark) and with its 2018 edition received an impact factor of 3,744 placing it in 1st quartile of both the Business and Management subject categories.

In their 2007 article, Nazari and Herremans acknowledged the wide usage of Pulic's method as well as commenting on its limitations. In their study, -for real economy businesses- they proposed to extend structural capital by making additions based on Skandia Navigator[2].

Although there are number of studies on financial institutions' ICE, most of these focused on institutions in a certain geographical area (Ting & Lean, 2009), (Joshi, Cahill, & Sidhu, 2013), (Ozkan, Cakan, & Kayacan, 2017), while the present study aims to compare a selection of IFIs from around the world. Previous studies with a narrower geographical and institutional focus include:

i) Mohiuddin et al. analysing 17 Bangladeshi commercial banks' ICE within a 2 years frame (Mohiuddin, Najibullah, & Shahid, 2006).

ii) A comparative study on ICE of domestic and foreign banks in India (Kamath, 2010).

iii) A relationship analysis between ICE and financial returns of banks that are listed in Turkey's Istanbul Stock Exchange (BIST) (Yalama, 2005).

iv) A variable analysis by Magdi El-Bannany on British banks' ICE between 1995 and 2005, which stresses that usage of information technology systems have a significant in impact on ICE (El-Bannany, 2008).

v) Another study on Indian banks by Sharma and Mani showed that, between 2005 and 2010, in terms of human capital efficiency (HCE), public banks were out-performed by private banks (Sharma & Mani, 2012).

In a study published in the Journal of Intellectual Capital, (Joshi, Cahill, & Sidhu, 2013) analysed Australian financial sector's intellectual capital performance using VAIC™ and concluded that investment companies had higher ICE compared to

[2] The Skandia Navigator is a collection of measurements methods for intangibles, first suggested by Leif Edvinsson at Skandia. The Navigator facilitates a holistic understanding of the organization and its value creation along 5 focus areas. These areas are; i) Financial focus, ii) Customer focus, iii) Process focus, iv) Renewal & Development focus and v) Human focus.

other financial institutions (i.e. insurance companies). The study also showed that higher VAIC™ was not necessarily correlated with higher financial performance.

Although VAIC™ is used widely in current studies; it has been criticized to present the correlation and have limits to present an adequate measurement and similar observation has been reported in some earlier studies (Firer & William, 2003), (Mosavi, Nekoueizadeh, & Ghaedi, 2012), (Ståhle, Aho, & Ståhle, 2011). Likewise, a paper by (Paknezhad & Ahmadkhani, 2012) found that VAIC™ failed to present a relationship between IC and financial return indicators such as return on assets (ROA).

Furthermore, there are several studies on expanding / improving VAIC™ by introducing other variables that Pulic's model discounts such as research and development expenses, advertising expenses etc. This study, although acknowledges present criticism, uses the original model proposed by Pulic to keep the results comparable with the most of the precedent studies that applied the model as it was.

CHAPTER II

2.1. DEFINITIONS AND METHODOLOGY

2.1.1. International Financial Institutions

In 1944, in a conference in Bretton Woods, New Hampshire, USA, three renowned experts (US Treasury Secretary Henry Morganthau, his lead economic advisor Harry Dexter White, and British economist John Maynard Keynes) shared their ideas on promoting international economic cooperation. As a result, the IMF and the WB, later known as the Bretton Woods Organisations (BWOs), were established. The original agreement included a third organisation, the International Trade Organisation (ITO), to promote and regulate international trade enabling economic growth for all (Baylis, Smith, & Owens, 2008). This only came into existence in 1995 in Geneva, Switzerland under the name of World Trade Organisation (WTO).

Over the decades, plenty of new IFIs have been established in different parts of the World with a variety of agendas. Their common goals can be summarised as follows:

i) Helping developing countries to attract foreign direct investment (FDI)
ii) Mitigating political risks and stimulating capital flows (both public and private) towards less developed countries/regions
iii) Enhancing hosting country's government's credibility
iv) Promoting either sub-regional, regional or international economic integration
v) Providing much needed liquidity to distressed economies during difficult times
vi) Funding large infrastructural projects
vii) Promoting economic liberalisation (i.e. lowering barriers to trade, easing capital regulations)

2.1.1.2. Selected IFIs

All of the currently operational 23 IFIs are included in this study and classified under three groups depending on their number of members; Group A) between 2 to 15 members, Group B) between 16 to 50 members and Group C) over 50 members. Table 1 below presents the Groups along with their full and –more commonly used– short names, year of establishment and latest number of members of the selected IFIs. While the majority of the members are sovereign countries, some of the selected IFIs also have institutional members (i.e. the EU is a member of the EBRD). The data collected and used in this study is available online, as all of these institutions publish their annual financial statements and activity reports.

Table 1 - Selected IFIs

Group A				
	Full name of the institution	**Short name**	**Est. year ↓**	**# of members**
1	Central American Bank for Economic Integration	CABEI	1960	15
2	East African Development Bank	EADB	1967	11
3	International Investment Bank	IIB	1970	9
4	Nordic Investment Bank	NIB	1975	8
5	Arab Bank for Economic Development in Africa	BADEA	1975	11
6	OPEC Fund for International Development	OFID	1976	12
7	Black Sea Trade and Development Bank	BSTDB	1997	12
8	Eurasian Development Bank	EDB	2006	6
9	New Development Bank	NDB	2014	5
Group B				
	Full name of the institution	**Short name**	**Est. year ↓**	**# of members**
1	Council of Europe Development Bank	CEB	1956	41
2	European Investment Bank	EIB	1958	27
3	Inter-American Development Bank	IADB	1959	48
4	Development Bank of Latin America	CAF	1968	19
5	Caribbean Development Bank	CDB	1969	27
6	West African Development Bank	BOAD	1973	17
Group C				
	Full name of the institution	**Short name**	**Est. year ↓**	**# of members**
1	International Bank for Reconstruction and Development	IBRD	1944	189
2	International Finance Corporation	IFC	1956	184
3	African Development Bank	AfDB	1964	80
4	Asian Development Bank	ADB	1966	68
5	Islamic Development Bank	IsDB	1975	57
6	International Fund for Agricultural Development	IFAD	1977	177
7	European Bank for Reconstruction and Development	EBRD	1991	69
8	Asian Infrastructure Investment Bank	AIIB	2016	76

2.1.1.3. Brief Background of the Selected IFIs

2.1.1.3.1 African Development Bank

After the end of colonial era in Africa, in 1963 African countries established the African Union. In the following year, member states founded the African Development Bank (AfDB) to promote sustainable economic development and social progress in its region in order to achieve poverty reduction. The AfDB operates along with the African Development Fund and Nigeria Trust Fund under the AfDB Group.

Based on 2018YE financial statements, bank's total asset size stood at XUA 33.8 billion (c. EUR 27.1 billion) with and equity base of 21%.

Link to AfDB Homepage & Financial Statements

2.1.1.3.2 Arab Bank for Economic Development in Africa

Owned by the members of the Arab League, the Arab Bank for Economic Development in Africa (or Banque Arabe pour le Développement Economique en Afrique, BADEA) was established in 1974. Bank's objectives include strengthening financial, economic and technical cooperation in Arabic regions in Africa by i) participating in financing economic development, ii) stimulating the contribution of Arabic capital to Africa's development and iii) providing the necessary technical assistance.

According to audited 2018YE results, BADEA's total asset size was USD 4.8 billion with an equity base of 98%. The bank has 11 members among which, Saudi Arabia, Kuwait and Iraq are the largest shareholders (26%, 16% and 15%, respectively.)

Link to BADEA Homepage & Financial Statements

2.1.1.3.3 Asian Development Bank

Established in 1966, the Asian Development Bank (ADB) promotes sustainable development and prosperity in the Asia-Pacific region, which accounts for a large portion of the World's underdeveloped countries. One of its prevailing goals is to eradicate extreme poverty through a number of tools such as direct investments, technical assistance and policy dialogue with the governments.

As of today, ADB has 68 member countries, 19 of which are from outside of its region. Based on the 2018 financial statements ADB's total asset size was USD 191.9 billion with an equity base of 27%. Shareholders with largest shares are the USA (16%), Japan (16%) and China (6%).

Link to ADB Homepage & Financial Statements

2.1.1.3.4 Asian Infrastructure Investment Bank

Initially proposed in 2009 after the global financial crises by China to utilize its foreign currency reserves in a more efficient way, the Asian Infrastructure Investment Bank (AIIB) was founded in 2016. The AIIB focuses on large infrastructure projects in the Asia-Oceania region, which it views as a tool of regional integration and foreign policy. Similar to other IFIs, the AIIB also promotes long-term sustainable economic development.

As of today, the AIIB has 78 shareholders and 24 prospective members from all around the World. Based on the 2018 financial statements the bank's total asset size was USD 19.6 billion with a very high equity base of 99%. China is the largest shareholder with 40% and followed by India (11%) and Russia (9%).

Link to AIIB Homepage & Financial Statements

2.1.1.3.5 Black Sea Trade and Development Bank

Founded by 12 countries in the Black Sea region in 1997, the Black Sea Trade and Development Bank (BSTDB) primarily promotes regional trade. The BSTDB also aims to enhance regional cooperation through loans, equity investments and guarantees to both private and public sectors. Furthermore, the bank does not have an announced political criteria for its investments (i.e. other institutions such as EIB and EBRD requires commitment to democratic principles). The BSTDB also provides financing to SMEs and trade finance facilities, mainly to local financial institutions.

The BSTDB has 12 member countries. Based on the 2018 financial statements its total asset size was EUR 1.8 billion with an equity base of 44%.

Link to BSTDB Homepage & Financial Statements

2.1.1.3.6 Caribbean Development Bank

Initially established by Caribbean Common Wealth countries together with Canada and the UK in 1969, the Caribbean Development Bank (CDB) attracted more members. The CDB provides funding and technical assistance primarily under four themes: i) education, ii) agriculture, iii) disaster prevention and iv) water and sanitation.

As of today, CDB has 27 shareholders, 19 of which are borrowing members from its region. Based on the 2018 financial statements its total asset size was USD 1.7 billion with an equity base of 53%.

Link to CDB Homepage & Financial Statements

2.1.1.3.7 Central American Bank for Economic Integration

Founded by five Central American countries in 1960, the Central American Bank for Economic Integration (CABEI) provides funding to its members for reducing poverty and inequality and aims to foster regional integration. The CABEI also has

specific programs for environmental sustainability. Over the years, the bank received new members from overseas such as China, Spain and South Korea.

As of today, CABEI has 15 shareholders countries. Based on the 2019 audited financial statements the bank's total asset size was USD 11.6 billion with an equity base of 30%.

Link to CABEI Homepage & Financial Statements

2.1.1.3.8 Council of Europe Development Bank

Initially founded as a fund for refugees in order to tackle the difficulties of over-population in 1956, the bank took its current name the Council of Europe Development Bank (CEB) in 1999. Today CEB's main goal is to promote social cohesion among its members by granting loans and participating in co-financing projects.

As of today, CEB has 41 member countries. Based on the 2018 financial statements its total asset size was EUR 24.3 billion with an equity base of 12%.

Link to CEB Homepage & Financial Statements

2.1.1.3.9 Development Bank of Latin America

Established as a development bank for the Latin America to ensure regional integration and sustainable development, the Development Bank for Latin America (or Corporación Andina de Fomento, CAF) provides funding and technical assistance for both private and public sectors in its region.

Currently, CAF has 19 member states and 13 private banks as shareholders. Based on the 2018 financial statements CAF's total asset size was USD 40.0 billion with an equity base of 30%.

Link to CAF Homepage & Financial Statements

2.1.1.3.10 East African Development Bank

Founded in 1967 by a multilateral treaty signed between Kenya, Tanzania and Uganda, the East African Development Bank (EADB) was used to called East African Cooperation. In addition to its lending products, EADB also provides advisory services and conducts policy dialogue for development of capital and real estate markets in its regions.

As of today, EADB has four shareholding countries and nine institutional members. Based on the 2017 financial statements EADB's total asset size was USD 0.4 billion with an equity base of 67%.

Link to EADB Homepage & Financial Statements

2.1.1.3.11 Eurasian Development Bank

Being one of the newest IFIs, the Eurasian Development Bank (EDB) was founded by Russia and Kazakhstan in 2006. While large infrastructural projects are the focus of EDB, it also provides technical assistance (i.e. energy efficiency, agricultural development), research, micro-finance and finance for small medium size enterprises (SMEs).

As of today, EDB has 6 shareholders. Based on the 2019 audited financial statements EDB's total asset size was USD 5.2 billion with an equity base of 36%.

Link to EDB Homepage & Financial Statements

2.1.1.3.12 European Bank for Reconstruction and Development

Following the dissolution of the Union of Soviet Socialist Republics (USSR), Western countries led by the USA established the European Bank for Reconstruction and Development (EBRD) in 1991. Initially focused on investing in the former USSR countries and the Eastern Bloc to promote market economy, over the years EBRD expanded its coverage to a wider geography.

As of today, EBRD has 69 shareholders (countries and other institutions). Based on the 2018 financial statements EBRD's total asset size was EUR 61.9 billion with an equity base of 26%.

Link to EBRD Homepage & Financial Statements

2.1.1.3.13 European Investment Bank

As part of the Treaty of Rome, which established the European Economic Community processor of the European Union (EU), the European Investment Bank (EIB) was founded in 1958 to promote EU policies such as integration and social cohesion in war-torn Europe. Although majority of EIB's investments are in the EU members, the bank also invests in other regions in the World with specific aims including private sector development and environmental sustainability.

All members of the EU are also members of the EIB, as of today it has 27 shareholders. Based on the 2018 financial statements EIB's total asset size was EUR 604.6 billion with an equity base of 11%.

Link to EIB Homepage & Financial Statements

2.1.1.3.14 Inter-American Development Bank

Established in 1959, the Inter-American Development Bank (IADB) is one of the largest development bank operating in the region based on the amount of funding provided. Covering Latin America and Caribbean region, the IADB's focus is on tackling social exclusion and inequality, low productivity and innovation and limited economic integration.

As of today, the IADB has 48 member countries. Based on the 2019 audited financial statements IADB's total asset size was USD 136.4 billion with an equity base of 25%.

Link to IADB Homepage & Financial Statements

2.1.1.3.15 International Bank for Reconstruction and Development

As one of the earliest IFIs, which was founded at the Bretton Woods Conference in 1944, the International Bank for Reconstruction and Development (IBRD) is a part of the World Bank Group (WBG). The IBRD has a global coverage in terms of investments and only provides funding to sovereign governments and investment projects with sovereign guarantees. The bank has wide access to international capital markets, hence is able to offer funding in 27 different currencies.

IBRD being the largest IFI in terms of the number of shareholders, as of today it has 189 countries in its ownership. Based on the 2018 financial statements IBRD's total asset size was USD 403.1 billion with an equity base of 10%.

Link to IBRD Homepage & Financial Statements

2.1.1.3.16 International Finance Corporation

As the private-sector wing of the WBG, the International Finance Corporation (IFC) was founded in 1956. In addition to financial investments, the IFC also provides advisory services and asset-management to the private sectors in developing countries. Working on a profit driven basis, IFC is aiming to reduce poverty and increase economic integration throughout the World.

As of today, IFC has 184 shareholders. Based on the 2018 financial statements IFC's total asset size was USD 94.3 billion with an equity base of 28%.

Link to IFC Homepage & Financial Statements

2.1.1.3.17 International Fund for Agricultural Development

As an outcome of the World Food Conference that was held in 1974, the International Fund for Agricultural Development (IFAD) was founded in 1977 as a subsidiary of the United Nations (UN). IFAD's main goal is to tackle poverty and hunger in World's rural regions through loans, grants and technical assistance. The

IFAD also works on issues like climate change, gender inequality, indigenous peoples and access to water.

As of today, IFAD has 177 shareholder countries. Based on the 2018 financial statements IFAD's total asset size was USD 9.0 billion with an equity base of 79%.

Link to IFAD Homepage & Financial Statements

2.1.1.3.18 International Investment Bank

In 1970, the International Investment Bank (IIB) was founded by the Council for Mutual Economic Assistance (COMECON). COMECON was a multilateral financial development institution for the USSR, the Eastern Bloc and several other socialist states from different parts of the World and dissolved in 1991. The IIB's institutional mission is to establish economic and social development and integration to increase prosperity in its regions focusing on SMEs.

Currently the IIB has nine shareholders. Based on the 2019 financial statements IIB's total asset size was EUR 1.4 billion with an equity base of 30%.

Link to IIB Homepage & Financial Statements

2.1.1.3.19 Islamic Development Bank

Founded by the members of the Organisation of Islamic Cooperation (OIC) in 1975, the Islamic Development Bank (IsDB) focuses in economic development in its member countries with a focus on Islamic finance. The IsDB provides funding to both public and private sectors, technical assistance, promotes tools of Islamic finance (i.e. Sukuk similar private bonds) and conducts direct equity investments in Islamic financial institutions.

As of today, IsDB has 57 shareholder countries. Based on the 2018 financial statements IsDB's total asset size was ID[3] 22.1 billion (c. USD 20.3 billion) with an equity base of 40%.

Link to IsDB Homepage & Financial Statements

2.1.1.3.20 New Development Bank

The newest IFI in the World, the New Development Bank (NDB) was founded in 2014 by Brazil, Russia, India, China and South Africa (BRICS states) and formerly referred as the BRICS Development Bank. The NDB provides loans, guarantees and equity investments to both public and private sectors.

NDB has five member countries (all of the BRICS countries). Based on the 2018 financial statements NDB's total asset size was USD 10.4 billion with an equity base of 96%.

Link to NDB Homepage & Financial Statements

2.1.1.3.21 Nordic Investment Bank

Established in 1975 by five Nordic countries, the Nordic Investment Bank (NIB) is a part of the Nordic Finance Group (NFG), which has two other funds and another risk capital institution in it. The NIB's product portfolio includes loans, guarantees for projects in energy, infrastructure and financial institutions sectors. The bank provides its services to both public and private sectors in its region.

With three Baltic countries joined in 2005, as of today NIB has 8 shareholding countries. Based on the 2019 audited financial statements NIB's total asset size was EUR 32.7 billion with an equity base of 11%.

Link to NIB Homepage & Financial Statements

[3] Islamic dinar.

2.1.1.3.22 OPEC Fund for International Development

In 1976, the members of the Organization of the Petroleum Exporting Countries (OPEC) founded the OPEC Fund for International Development (OFID). The fund aims to increase cooperation between OPEC members and developing countries through financial support to promote socioeconomic development. In addition to financial and advisory services, OFID also provides aids for food, research and humanitarian relief.

Following Qatar's resignation from membership in early 2019, OFID currently has 12 shareholders. Based on the 2018 financial statements OFID's total asset size was USD 7.4 billion with an equity base of 97%.

Link to OFID Homepage & Financial Statements

2.1.1.3.23 West African Development Bank

Founded in 1973, the West African Development Bank (or Banque Ouest Africaine de Développement, BOAD) is established by the Central Bank of West African States and its members. BOAD's investments focus on three pillars, i) reduction of poverty, ii) economic integration and iii) private sector promotion. The bank also has direct lending programs for its member governments.

Currently BOAD has 8 African shareholding countries and 9 other members from around the World. Based on the 2017 financial statements BOAD's total asset size was XOF 2,653.3 billion (c. USD 4.4 billion) with an equity base of 27%.

Link to BOAD Homepage & Financial Statements

2.1.2. Value Added Intellectual Coefficient (VAIC™)

In the 2nd McMaster World Congress in 1998, Ante Pulic (an economics professor from Croatia) delivered a presentation on measuring intellectual potential performance, in which he argued that "*business success depends… …on the ability and efficiency of using company knowledge*". Pulic acknowledged other scholars' works ((Edvinsson, 1997), (Sveiby, 1997) and (Stewart, 1998)) in his presentation, he criticized their suggested methods to be subjective (Edvinsson himself wrote "*…apply some subjective judgments*") and argued that intellectual capital efficiency can be measured with data from financial statements alone.

In 2004, Pulic developed his method further and proposed a simple formula for Value Added Intellectual Coefficient (VAIC™). According to Pulic, the two main parameters of VAIC™ are Capital Employed Efficiency (CEE) and Intellectual Capital Efficiency (ICE).

Figure 1 VAIC™ Model Breakdown 1

$$\text{VAIC}^{\text{TM}} = \text{CEE} + \text{ICE}$$

While CEE represents the performance of financial and physical capital usage; according Pulic, measuring the performance of non-physical and employee-related inputs, ICE, has two sub-components; i) Structural Capital Efficiency (SCE) and ii) Human Capital Efficiency (HCE).

Figure 2 VAIC™ Model Breakdown 2

$$\text{VAIC}^{\text{TM}} = \text{CEE} + \text{SCE} + \text{HCE}$$

In Pulic's model, value added (VA) is used as the key performance factor and it is either a numerator or denominator in all the three variables above. Pulic's model identifies VA as a comparable indicator (similar to EBITDA[4] in a sense), as

[4] Earnings Before Interest Tax Depreciation and Amortization.

illustrated in Figure 1, VA is composed of: i) Net Operating Profit After Tax, ii) Human Capital (HC) and Depreciation and Amortisation (DA).

Figure 3 Value Added in Ante Pulic's VAIC^{TM} Model - 1

$$\text{NOPAT} + \text{HC} + \text{DA} = \text{Value Added (VA)}$$

NOPAT for financial institutions differ from corporates in several ways. For example while interest expense typically is not an operational expense for corporates, it is the main operational cost item for financial institutions most of the time.

Hence in this study, the below formula for financial institutions NOPAT calculation (Fraker, 2006) is utilized, which adds-back net charge-offs to net income.

$$\text{NOPAT} = \text{Net Income} + \text{Net Charge-off}$$

Furthermore, net charge-off consists of provisional expense and income.

$$\text{NOPAT} = \text{Net Income} + (\text{Provision Expense} - \text{Provision Income})$$

Similar to other studies, Pulic also states that employee expenses are different from other expenses (i.e. electricity or rent) and they ought to be treated as an investment by nature representing the HC. According to the model, HC is corresponding to sum of the salary and other employee related expenses (i.e. trainings, awards).

The VAIC^{TM} model interprets the difference between VA and HC as the Structural Capital (SC), which corresponds to non-physical assets that are not related to employees (i.e. institutional culture, working environment/systems).

Figure 4 Value Added in Ante Pulic's VAIC^{TM} Model - 2

$$\text{VA} - \text{HC} = \text{SC}$$

In his model, Pulic further breaks down the equation in **Figure 2** to the components of as following:

Figure 5 VAIC^{TM} Model Breakdown 3

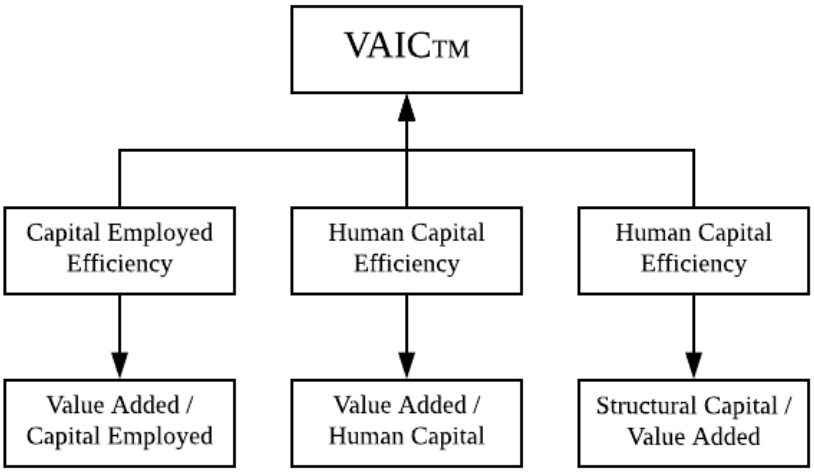
$$VAIC^{TM} = \frac{VA}{CE} + \frac{SC}{VA} + \frac{VA}{HC}$$

Overall, Ante Pulic's model has three components all of which are linked to VA. While the majority of the criticism that the model has faced has been about its claimed ability to measure IC (Ståhle, Aho, & Ståhle, 2011), the Model has also been contended for failing to provide meaningful data in cases where VA is negative (Mehralian, Rasekh, Akhavan, & Sadeh, 2012).

Furthermore, a more recent study points out the interrelation between SC and HC (please see **Figure 4** above). The fact that SC is a dependent variable of another component of the model has been considered a significant problem (Vishnu, 2015).

Nonetheless, evidenced by the large number of articles reviewed, VAIC^{TM} still remains a valuable tool to measure IC objectively as it depends only on financial statements. Despite some valid criticisms and ongoing works to improve the model, for the purposes of comparing IFIs the model is considered efficient as is.

Figure 6 Ante Pulic's VAIC^{TM} Model (2004)



CHAPTER III

3.1. DATA AND CALCULATIONS

All of the selected IFIs, as part of their mandates, support transparency and publish their audited financial statements on their websites. The majority of them have not published the 2019 audit reports while this study was being conducted, a few of them did not even publish the 2018 audited results. Hence, the data used here is based on the latest available audit reports on respective websites. For each IFI, financial statements of three consecutive years have been analysed.

Table 2 – Years of Data Used

Group A				
	Full name of the institution	**Year 1**	**Year 2**	**Year 3**
1	Central American Bank for Economic Integration	2017	2018	2019
2	East African Development Bank	2015	2016	2017
3	International Investment Bank	2017	2018	2019
4	Nordic Investment Bank	2017	2018	2019
5	Arab Bank for Economic Development in Africa	2016	2017	2018
6	OPEC Fund for International Development	2016	2017	2018
7	Black Sea Trade and Development Bank	2016	2017	2018
8	Eurasian Development Bank	2017	2018	2019
9	New Development Bank	2016	2017	2018
Group B				
	Full name of the institution	**Year 1**	**Year 2**	**Year 3**
1	Council of Europe Development Bank	2016	2017	2018
2	European Investment Bank	2016	2017	2018
3	Inter-American Development Bank	2017	2018	2019
4	Development Bank of Latin America	2016	2017	2018
3	Caribbean Development Bank	2016	2017	2018
4	West African Development Bank	2015	2016	2017
Group C				
	Full name of the institution	**Year 1**	**Year 2**	**Year 3**
1	International Bank for Reconstruction and Development	2016	2017	2018
2	International Finance Corporation	2016	2017	2018
3	African Development Bank	2016	2017	2018
4	Asian Development Bank	2016	2017	2018
5	Islamic Development Bank	2016	2017	2018
6	International Fund for Agricultural Development	2016	2017	2018
7	European Bank for Reconstruction and Development	2016	2017	2018
8	Asian Infrastructure Investment Bank	2016	2017	2018

As VAIC^{TM} does not consider currency, calculation was based on data in reported currencies. While the majority of the IFIs report in hard currency, West African Development Bank reports in West African Franc (XOF), Islamic Development Bank uses Islamic Dinar (ID) and African Development Bank reports in a virtual currency Unit of Account (UA).

From the financial statements, the following figures were used for calculating VA and the other components of the model (figures presented in **Table 3**):

i) Net Income (NI),
ii) Provisions,
iii) Employee costs (EC),
iv) Depreciation and amortization (DA),
v) Capital employed (CE).

Table 3 – Data Used for Year 1 (millions)

	Group A						
	Full name of the institution	**Cur.**	**NI**	**Provision**	**EC**	**DA**	**CE**
1	Central American Bank for Economic Integration	USD	83.8	(97.4)	28.2	3.4	2,830.6
2	East African Development Bank	USD	6.7	1.0	4.2	0.7	239.0
3	International Investment Bank	EUR	1.0	12.1	18.9	1.0	395.7
4	Nordic Investment Bank	EUR	211.0	5.4	43.2	1.7	3,456.3
5	Arab Bank for Economic Development in Africa	USD	79.1	1.6	12.2	0.5	4,427.8
6	OPEC Fund for International Development	USD	170.0	43.4	43.6	2.2	7,002.5
7	Black Sea Trade and Development Bank	EUR	1.8	5.9	14.3	0.6	752.7
8	Eurasian Development Bank	USD	41.7	26.7	24.1	1.2	1,709.6
9	New Development Bank	USD	227.7	-	11.3	0.0	9,605.4
	Group B						
	Full name of the institution	**Cur.**	**NI**	**Provision**	**EC**	**DA**	**CE**
1	Council of Europe Development Bank	EUR	104.9	(0.1)	45.7	2.9	2,811.9
2	European Investment Bank	EUR	(278.8)	(26.0)	908.3	35.0	62,467.8
3	Inter-American Development Bank	USD	615.0	(27.0)	819.0	33.7	32,247.0
4	Development Bank of Latin America	USD	122.7	38.3	141.0	5.7	10,473.6
5	Caribbean Development Bank	USD	(12.8)	-	9.3	1.3	896.5
6	West African Development Bank	XOF	8,839.0	5,873.0	11,226.0	1,187.0	734,149.0
	Group C						
	Full name of the institution	**Cur.**	**NI**	**Provision**	**EC**	**DA**	**CE**
1	International Bank for Reconstruction and Development	USD	495.0	57.0	1,822.0	668.0	37,063.0
2	International Finance Corporation	USD	(0.0)	359.0	933.0	17.0	22,766.0
3	African Development Bank	UA	25.1	67.8	130.1	10.0	6,605.7
4	Asian Development Bank	USD	7.0	11.0	390.0	47.0	17,214.0
5	Islamic Development Bank	ISL	307.1	61.9	150.2	8.5	8,329.6
6	International Fund for Agricultural Development	USD	(423.1)	25.9	83.8	2.6	6,638.8
7	European Bank for Reconstruction and Development	EUR	992.0	57.0	445.0	22.0	15,558.0
8	Asian Infrastructure Investment Bank	USD	167.4	0.3	30.7	-	17,789.8

In order to enhance comparability of the model, one-off income and expenses were adjusted by adding back or deducting from the net income of the period (i.e. Asian Development Bank reported USD 30.7 billion income from assets transfer in 2017).

As HC in the model encompasses all employee related costs, the salary expenses and overhead costs reported under General and Administrative Expenses were used. This approach is in line with the preceding research.

Although the capital employed is formulated as shown in **Figure 7** for corporates, total equity (Shareholders' Equity) itself is used for financial institutions as capital employed (Sledzik, 2013).

Figure 7 Capital Employed Formulation for Corporates

$$CE = \text{Net Assets} = (\text{Total Assets} - \text{Current Liabilities})$$

Last of all, some of the selected IFIs have subsidiaries, which brings up the question of consolidation in terms of their financial statements. While some of them disclose their consolidated financial reports in addition to their standalone figures, some of the audit reports are only on a consolidated basis. Hence, for the sake of consistency, consolidated statements were utilized for all IFIs that have at least one subsidiary.

3.1.1. VAIC™ Calculations

As the first step, NOPAT is calculated by adding back the provision expenses to the net income of the year eliminating each IFI's debt collection ability in order to reach a comparable indicator. That is being said, NOPAT is a numeric figure and it is in reporting currency of the respective IFI.

Table 4 – Calculated NOPAT (millions)

Group A					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Central American Bank for Economic Integration	USD	(13.6)	267.7	232.1
2	East African Development Bank	USD	7.7	9.5	12.9
3	International Investment Bank	EUR	13.1	5.8	5.1
4	Nordic Investment Bank	EUR	216.4	167.1	182.5
5	Arab Bank for Economic Development in Africa	USD	80.7	132.9	171.1
6	OPEC Fund for International Development	USD	213.4	277.1	148.0
7	Black Sea Trade and Development Bank	EUR	7.6	17.8	11.5
8	Eurasian Development Bank	USD	68.5	73.3	75.2
9	New Development Bank	USD	227.7	158.0	169.6
Group B					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Council of Europe Development Bank	EUR	104.8	112.0	100.3
2	European Investment Bank	EUR	(304.8)	3,230.0	3,551.9
3	Inter-American Development Bank	USD	588.0	877.0	1,342.0
4	Development Bank of Latin America	USD	161.0	146.3	236.8
5	Caribbean Development Bank	USD	(12.8)	(3.2)	5.2
6	West African Development Bank	XOF	14,712.0	18,166.0	20,085.0
Group C					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	International Bank for Reconstruction and Development	USD	552.0	(226.0)	667.0
2	International Finance Corporation	USD	359.0	1,508.0	1,370.0
3	African Development Bank	UA	92.9	193.4	118.5
4	Asian Development Bank	USD	18.0	809.0	872.0
5	Islamic Development Bank	ISL	369.1	251.0	133.3
6	International Fund for Agricultural Development	USD	(397.3)	93.2	(426.2)
7	European Bank for Reconstruction and Development	EUR	1,049.0	775.0	532.0
8	Asian Infrastructure Investment Bank	USD	167.6	261.4	339.1

Next, VA calculation was conducted based on the above-mentioned assumption that human capital is equal to salary and other overhead employee expenses (**Table 5**). For the International Fund for Agricultural Development in Year 1 and Year 3 and for the Caribbean Development Bank in Year 1, VA calculation results were in negative territory. Although the model is criticised for not producing meaningful results when VA is negative – as mentioned under **Section 2.1.2.** –, this study disregards those criticisms and keeps both of the IFIs in the data group.

Similar to NOPAT, unless converted into the same currency VA is not comparable and nominal. As VAIC^{TM} is a model consisting of ratios not nominal values, neither NOPAT nor VA is converted into selected currencies.

Table 5 – Calculated VA (millions)

Group A					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Central American Bank for Economic Integration	USD	18.0	302.1	269.4
2	East African Development Bank	USD	12.6	14.3	17.3
3	International Investment Bank	EUR	33.0	27.3	28.0
4	Nordic Investment Bank	EUR	261.2	210.3	233.7
5	Arab Bank for Economic Development in Africa	USD	93.4	145.0	184.4
6	OPEC Fund for International Development	USD	259.2	323.8	199.8
7	Black Sea Trade and Development Bank	EUR	22.5	33.0	27.9
8	Eurasian Development Bank	USD	93.7	96.5	107.8
9	New Development Bank	USD	239.0	177.0	195.2
Group B					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Council of Europe Development Bank	EUR	153.4	160.5	151.2
2	European Investment Bank	EUR	638.5	4,345.2	4,786.1
3	Inter-American Development Bank	USD	1,440.7	1,759.5	2,217.5
4	Development Bank of Latin America	USD	307.6	302.2	401.1
5	Caribbean Development Bank	USD	(2.2)	11.5	17.2
6	West African Development Bank	XOF	27,125.0	30,453.0	35,272.0
Group C					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	International Bank for Reconstruction and Development	USD	3,042.0	2,185.0	3,247.0
2	International Finance Corporation	USD	1,309.0	2,487.0	2,450.0
3	African Development Bank	UA	233.0	356.4	302.2
4	Asian Development Bank	USD	455.0	1,462.0	1,543.0
5	Islamic Development Bank	ISL	527.7	405.9	293.6
6	International Fund for Agricultural Development	USD	(310.8)	188.7	(326.4)
7	European Bank for Reconstruction and Development	EUR	1,516.0	1,196.0	952.0
8	Asian Infrastructure Investment Bank	USD	198.3	317.7	424.9

Once VA is calculated, the three main components of VAIC^{TM}, namely Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE), (see **Figure 2**) can be determined.

This study uses shareholders' equity for capital employed in the CEE formulation, in which it is the denominator to VA. CEE illustrates the efficiency of the use of

capital in terms of creating value. Hence, higher CEE translates into higher efficiency. International Finance Corporation (IFC) has the highest CEE over the analysed period with 0.099 in Year 2 (2017), whereas – excluding negative results due to negative VA – European Investment Bank (EIB) has the lowest CEE with 0.010 in Year 1 (2016).

Table 6 – Capital Employed Efficiency (CEE)

Group A					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Central American Bank for Economic Integration	USD	0.006	0.094	0.078
2	East African Development Bank	USD	0.053	0.057	0.066
3	International Investment Bank	EUR	0.084	0.072	0.069
4	Nordic Investment Bank	EUR	0.076	0.059	0.063
5	Arab Bank for Economic Development in Africa	USD	0.021	0.030	0.038
6	OPEC Fund for International Development	USD	0.037	0.045	0.028
7	Black Sea Trade and Development Bank	EUR	0.030	0.044	0.035
8	Eurasian Development Bank	USD	0.055	0.056	0.058
9	New Development Bank	USD	0.025	0.018	0.020
Group B					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Council of Europe Development Bank	EUR	0.055	0.054	0.050
2	European Investment Bank	EUR	0.010	0.066	0.069
3	Inter-American Development Bank	USD	0.045	0.053	0.065
4	Development Bank of Latin America	USD	0.029	0.027	0.034
5	Caribbean Development Bank	USD	(0.002)	0.013	0.019
6	West African Development Bank	XOF	0.037	0.042	0.049
Group C					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	International Bank for Reconstruction and Development	USD	0.082	0.055	0.078
2	International Finance Corporation	USD	0.057	0.099	0.094
3	African Development Bank	UA	0.035	0.050	0.042
4	Asian Development Bank	USD	0.026	0.029	0.030
5	Islamic Development Bank	ISL	0.063	0.048	0.034
6	International Fund for Agricultural Development	USD	(0.047)	0.027	(0.046)
7	European Bank for Reconstruction and Development	EUR	0.097	0.074	0.058
8	Asian Infrastructure Investment Bank	USD	0.011	0.017	0.022

Overall, (across groups and years) a total of 60 CEE observations were made with a mean of 0.045 and a variance of 0.001 indicating that the observed ratios are not much distant from each other.

Table 7 – Observed CEE Statistics

# of Observations	Mean	Median	St. Deviation	Variance
69	0.044	0.045	0.028	0.001

For this study human capital was assumed to be consisting of employee costs. For the calculation of Human Capital Efficiency (HCE) (see **Figure 5**), VA was numerator and employee costs was the denominator. Due to formulation structure of the model, HC is a component of VA; hence, HCE is a ratio greater than 0 by definition (except for the cases in which VA is negative).

Table 8 – Human Capital Efficiency (HCE)

Group A					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Central American Bank for Economic Integration	USD	0.638	9.831	8.122
2	East African Development Bank	USD	3.013	3.525	4.813
3	International Investment Bank	EUR	1.751	1.333	1.254
4	Nordic Investment Bank	EUR	6.047	5.093	5.268
5	Arab Bank for Economic Development in Africa	USD	7.664	12.728	14.821
6	OPEC Fund for International Development	USD	5.945	7.260	4.078
7	Black Sea Trade and Development Bank	EUR	1.573	2.235	1.747
8	Eurasian Development Bank	USD	3.894	4.377	3.435
9	New Development Bank	USD	21.225	9.401	7.711
Group B					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Council of Europe Development Bank	EUR	3.358	3.555	3.210
2	European Investment Bank	EUR	0.703	4.038	4.017
3	Inter-American Development Bank	USD	1.759	2.085	2.659
4	Development Bank of Latin America	USD	2.182	2.013	2.534
5	Caribbean Development Bank	USD	(0.238)	0.871	1.687
6	West African Development Bank	XOF	2.416	2.747	2.525
Group C					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	International Bank for Reconstruction and Development	USD	1.670	1.248	1.827
2	International Finance Corporation	USD	1.403	2.585	2.381
3	African Development Bank	UA	1.791	2.412	1.823
4	Asian Development Bank	USD	1.167	2.529	2.611
5	Islamic Development Bank	ISL	3.514	2.766	1.931
6	International Fund for Agricultural Development	USD	(3.708)	2.038	(3.381)
7	European Bank for Reconstruction and Development	EUR	3.407	3.028	2.435
8	Asian Infrastructure Investment Bank	USD	6.468	5.663	5.014

The highest HCE observation of 21.225 is based on New Development Bank's (NDB) Year 1 (2016) figures, whereas the lowest – excluding negative results – is 0.703 of EIB in Year 1 (2016). Although an increase in HCE suggests an improvement in employee productivity that translates into augmenting value, the outliers (such as NDB) and the reason(s) behind their performances require further examination and acknowledgement.

Overall (across groups and years), the 60 HCE observations has a mean value of 3.217 and a variance of 10.218 suggesting a wide spread.

Table 9 – Observed HCE Statistics

# of Observations	Mean	Median	St. Deviation	Variance
69	3.674	2.611	3.653	13.347

The last component of the VAIC™ model is Structural Capital Efficiency (SCE), which is calculated by dividing Structural Capital (SC) with VA. Often defined as a combination of competitive intelligence, patents, information systems etc. SC is the intellectual assets, which remains with the institution regardless of employees' presence.

Table 10 – Structural Capital Efficiency (SCE)

Group A					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Central American Bank for Economic Integration	USD	(0.569)	0.898	0.877
2	East African Development Bank	USD	0.668	0.716	0.792
3	International Investment Bank	EUR	0.429	0.250	0.202
4	Nordic Investment Bank	EUR	0.835	0.804	0.810
5	Arab Bank for Economic Development in Africa	USD	0.870	0.921	0.933
6	OPEC Fund for International Development	USD	0.832	0.862	0.755
7	Black Sea Trade and Development Bank	EUR	0.364	0.552	0.428
8	Eurasian Development Bank	USD	0.743	0.772	0.709
9	New Development Bank	USD	0.953	0.894	0.870
Group B					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	Council of Europe Development Bank	EUR	0.702	0.719	0.688
2	European Investment Bank	EUR	(0.423)	0.752	0.751
3	Inter-American Development Bank	USD	0.432	0.520	0.624
4	Development Bank of Latin America	USD	0.542	0.503	0.605
5	Caribbean Development Bank	USD	5.204	(0.148)	0.407
6	West African Development Bank	XOF	0.586	0.636	0.604
Group C					
	Full name of the institution	**Cur.**	**Year 1**	**Year 2**	**Year 3**
1	International Bank for Reconstruction and Development	USD	0.401	0.199	0.453
2	International Finance Corporation	USD	0.287	0.613	0.580
3	African Development Bank	UA	0.442	0.585	0.452
4	Asian Development Bank	USD	0.143	0.605	0.617
5	Islamic Development Bank	ISL	0.715	0.638	0.482
6	International Fund for Agricultural Development	USD	1.270	0.509	1.296
7	European Bank for Reconstruction and Development	EUR	0.706	0.670	0.589
8	Asian Infrastructure Investment Bank	USD	0.845	0.823	0.801

In the model SC is a residual of VA and HC, both of which are actual values obtained from financial statements. However, SC in Pulic's work is not an actual value but the return of it (Andriessen, 2004).

Among the calculated SCEs, the Caribbean Development Bank (CDB) has the highest SCE of 5.204 in Year 1 (2016) figures, while – excluding negative results – Asian Development Bank (ADB) has the lowest with 0.143 also in Year 1 (2016). The mean of 60 SCE observations is 0.637 and the variance is 0.422.

Table 11 – Observed SCE Statistics

# of Observations	Mean	Median	St. Deviation	Variance
69	0.6753	0.6385	0.6278	0.3941

Finally, Value Added Intellectual Coefficient (VAIC^{TM}) is derived by the sum of CEE, HCE and SCE (see **Table 13**), which provides a comparable indicative ratio for the efficiency of subject IFIs intellectual capital.

According to the model, in terms of mean VAIC^{TM}, Group A is highest in each observation year and 3-year average among all groups and Group B outperforms Group C (see **Table 13**). This suggests that with higher number of shareholders present, intellectual capital efficiency decreases.

However, the noticeable difference in the variance of each group's observed VAIC^{TM} challenges the above suggestion. While Group A seems to be the best performing one based on the group's average and median VAIC^{TM}, it also has the highest variance.

Table 12 – Observed VAIC^{TM} Statistics

Group	# of Observations	Mean	Median	St. Deviation	Variance
Group A	9	6.60	6.35	3.89	15.14
Group B	6	3.14	3.02	0.51	0.26
Group C	8	2.85	2.64	1.87	3.51
Total	23	4.39	3.33	3.22	10.36

Although VAIC^{TM} gets a value between 1 and 3 for corporates (Ståhle, Aho, & Ståhle, 2011), the range is wider for the 69 observations in this study mostly due to i) negative VA and ii) IFI sector specifics (-2.5 and 22.2, including outliers[5] and 0.1 and 10.8, excluding outliers). Outliers is illustrated in **Figure 9** and **Figure 10** for all 23 and 69 observations, respectively.

[5] Among 23 selected IFIs, New Development Bank, Arab Bank for Economic Development in Africa and International Fund for Agricultural Development stand out as outliers.

Figure 8 VAIC^{TM} Observations – 3-Years Average (23 Observations)

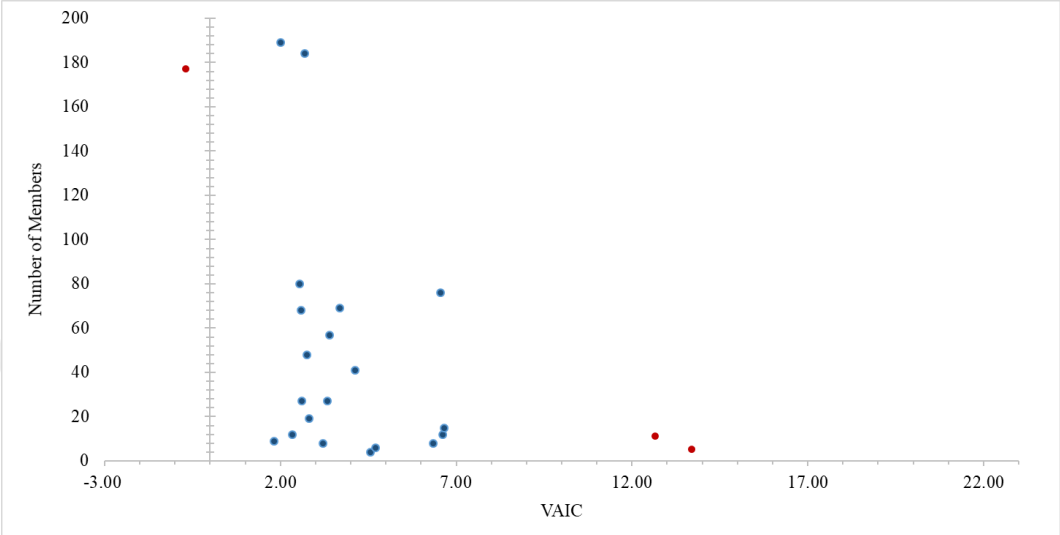


Figure 9 VAIC^{TM} Observations – Complete Dataset (69 Observations)

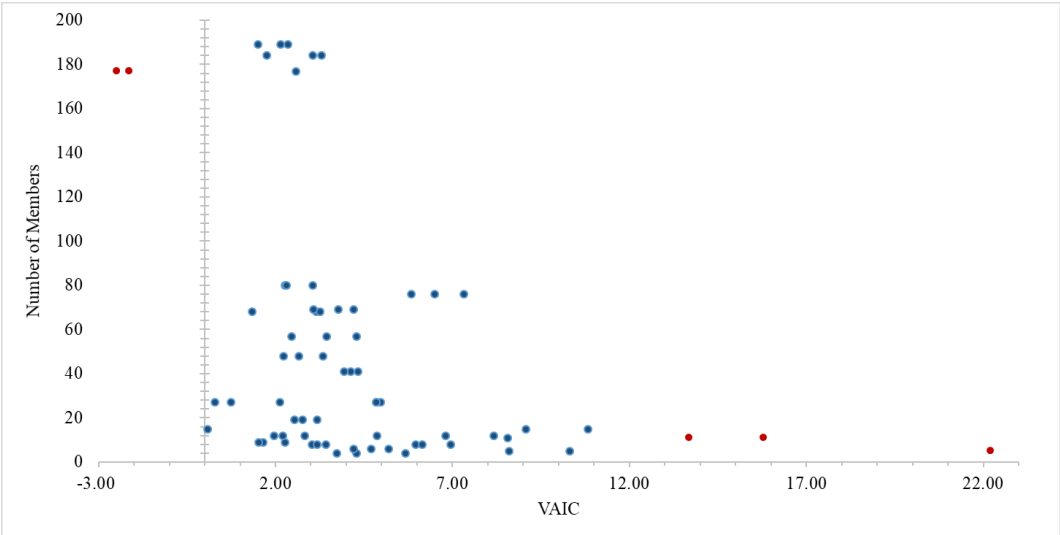


Table 13 – VAIC^{TM} Observations

Group A					
	Full name of the institution	**Year 1**	**Year 2**	**Year 3**	**Mean**
1	Central American Bank for Economic Integration	0.075	10.824	9.077	6.659
2	East African Development Bank	3.734	4.298	5.672	4.568
3	International Investment Bank	2.263	1.656	1.524	1.815
4	Nordic Investment Bank	6.958	5.955	6.140	6.351
5	Arab Bank for Economic Development in Africa	8.554	13.679	15.791	12.675
6	OPEC Fund for International Development	6.814	8.168	4.860	6.614
7	Black Sea Trade and Development Bank	1.967	2.831	2.210	2.336
8	Eurasian Development Bank	4.692	5.204	4.202	4.699
9	New Development Bank	22.203	10.313	8.601	13.705
	Mean	**6.362**	**6.992**	**6.453**	**6.602**

Group B					
	Full name of the institution	**Year 1**	**Year 2**	**Year 3**	**Mean**
1	Council of Europe Development Bank	4.115	4.327	3.949	4.130
2	European Investment Bank	0.291	4.857	4.837	3.328
3	Inter-American Development Bank	2.235	2.658	3.348	2.747
4	Development Bank of Latin America	2.753	2.543	3.173	2.823
5	Caribbean Development Bank	4.964	0.735	2.113	2.604
6	West African Development Bank	3.039	3.425	3.178	3.214
	Mean	**2.900**	**3.091**	**3.433**	**3.141**

Group C					
	Full name of the institution	**Year 1**	**Year 2**	**Year 3**	**Mean**
1	International Bank for Reconstruction and Development	2.153	1.501	2.358	2.004
2	International Finance Corporation	1.748	3.298	3.055	2.700
3	African Development Bank	2.268	3.047	2.317	2.544
4	Asian Development Bank	1.336	3.163	3.258	2.586
5	Islamic Development Bank	4.293	3.452	2.446	3.397
6	International Fund for Agricultural Development	(2.485)	2.575	(2.131)	(0.681)
7	European Bank for Reconstruction and Development	4.211	3.772	3.083	3.688
8	Asian Infrastructure Investment Bank	7.325	6.503	5.836	6.555
	Mean	**2.606**	**3.414**	**2.528**	**2.849**

In order to accurately assess whether there is a correlation between the number of shareholders and intellectual capital efficiency, more comprehensive statistical methods should to be utilised. For this study, T-test and Anova were chosen to assess the correlation. Given the limited number of IFIs, a couple of adjustments were made to the dataset as detailed in the following section.

3.1.2. Adjustments to the dataset

Given the fact that the number of IFIs is very limited, the number of VAIC™ observations are also limited. Hence, instead of using 23 observations (3 years average VAIC™) in order to enlarge the dataset, each year's VAIC™ observation assumed to be a data from a different IFI, as illustrated in **Figure 10**.

During the analysed three years period, none of the selected IFIs', which are close to the group thresholds, member numbers changed enough to move them to a different Group.

Figure 10 Adjustment to Enlarge Dataset

Calculation Results			
Name of the IFI	Year 1	Year 2	Year 3
ABC	X	Y	Z

→

Dataset for Statistical Testing	
Name of the IFI	Data
ABC 1	X
ABC 2	Y
ABC 3	Z

Furthermore, the observations are capped with a minimum of 0 and a maximum of 10, in an attempt to eliminate outliers which enhances the accuracy of statistical testing methods. The resulting dataset is composed of 69 observations, varying between 0 and 10, and grouped under three –previously mentioned– groups.

Table 14 – Complete Dataset for Statistical Testing

All Observations			
	Group A	**Group B**	**Group C**
1	0.075	0.291	0.000
2	1.524	0.735	0.000
3	1.656	2.113	1.336
4	1.967	2.235	1.501
5	2.210	2.543	1.748
6	2.263	2.658	2.153
7	2.831	2.753	2.268
8	3.734	3.039	2.317
9	4.202	3.173	2.358
10	4.298	3.178	2.446
11	4.692	3.348	2.575
12	4.860	3.425	3.047
13	5.204	3.949	3.055
14	5.672	4.115	3.083
15	5.955	4.327	3.163
16	6.140	4.837	3.258
17	6.814	4.857	3.298
18	6.958	4.964	3.452
19	8.168		3.772
20	8.554		4.211
21	8.601		4.293
22	9.077		5.836
23	10.000		6.503
24	10.000		7.325
25	10.000		
26	10.000		
27	10.000		

3.1.3. T-Test Application

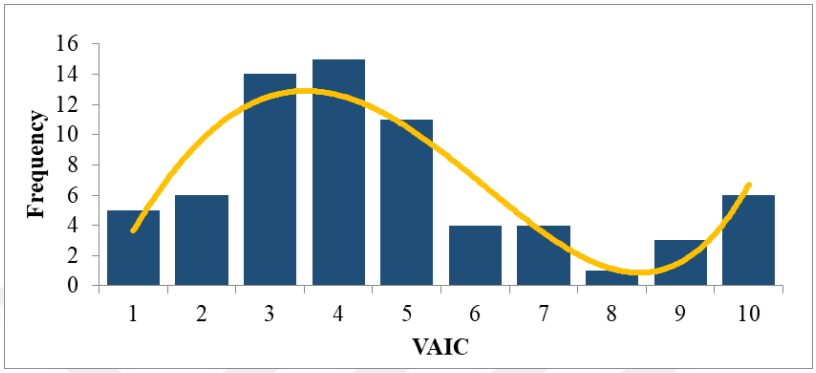
In order to assess whether a relation between the number of shareholders and IFIs' VAIC^{TM} is present, a statistical hypothesis testing is conducted using the T-test.

The T-test is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups based on following assumptions:

i) Dependent variables are ratio or interval,
ii) Dataset follows normal distribution,
iii) Dataset is representative of the population (in this case dataset equals to the population).

The dataset in this study composes of 69 ratio/coefficient (VAIC™) observations which follows normal distribution to a large extent.

Figure 11 Dataset Histogram



The null hypothesis for the T-test is that the means of the each pair of groups are equal, which can be formulated as following:

$$H_0 : \mu_A = \mu_B \quad \text{OR} \quad H_0 : \mu_A - \mu_B = 0$$

$$H_0 : \mu_B = \mu_C \quad \text{OR} \quad H_0 : \mu_B - \mu_C = 0$$

$$H_0 : \mu_A = \mu_C \quad \text{OR} \quad H_0 : \mu_A - \mu_C = 0$$

In which, μ_A, μ_A and μ_C represents the means of respective groups.

A T-test on each pair of groups is conducted at a 5% confidence level, using the "T-test: Two-Sample Assuming Unequal Variances" data analysis tool in Excel (Microsoft Office 2016). The null hypothesis for each pair is rejected when the p-value (illustrated as P(T<=t) two-tail) in the results) is less than the confidence level of 5% (or 0.05).

3.1.4. ANOVA Application

While T-test is a useful tool for analysing the relation between two groups, for larger number of groups an analysis of variance (ANOVA) can be utilised. ANOVA is based on following three assumptions:

i) Normality, meaning the distribution of residuals is normal.

ii) Homogeneity, meaning the populations' variances are equal.

iii) Independence of cases, meaning the observations are independent from each other.

The homogeneity assumption is tested using Levene test in Excel, which consists of an ANOVA analysis on a dataset of residuals of group's means. The null hypothesis for the Levene test is that the groups' variances are equal.

Based on these assumptions and same dataset as the T-tests, an ANOVA is conducted on the null hypothesis as below.

$$H_0 : \mu_A = \mu_B = \mu_C$$

Again, the null hypothesis is rejected when the p-value is less than the confidence level of 5% (or 0.05).

3.1.5. Regression Application

In addition to ANOVA's assumptions above, regression analysis has an additional assumption, linearity, which means the relationship between the dependent variable (VAIC™ observations) and the independent variables are linear.

Based on these four assumptions and the complete dataset (i.e. no grouping), a regression analysis is conducted against below independent variables:

i) Number of members

ii) Equity Base = Shareholders' Equity / Total Assets

iii) Age of the IFI = Data year – Establishment year

A regression line is derived at the confidence level of 5% (or 0.05).

CHAPTER IV

4.1. RESULTS

4.1.1. ANOVA Results

In order to test the homogeneity assumption, a Levene test is conducted in Excel. Although the Levene test concludes (**Table 15**) that the variances of the groups are not equal, as per the precedent studies ANOVA is conducted based on the fact that the number of observations under each group is similar to each other.

Table 15 – Levene Test Results

Groups	*Count*	*Sum*	*Average*	*Variance*
A Diff.	27	70.83	2.62	2.51
B Diff.	18	17.52	0.97	0.69
C Diff.	24	29.51	1.23	1.48

ANOVA

Source of Variation	*SS*	*df**	*MS*	*F*	*P-value*	*F crit*
Between Groups	37.84	2	18.92	11.24	0.00	3.14
Within Groups	111.07	66	1.68			
Total	148.91	68				

**degree of freedom*

Consequently, to assess the three groups all together in order to find out whether their datasets / observations differ significantly enough to make a comparison amongst themselves, a variance analysis (ANOVA) is conducted. The analysis was done using the "Anova: Single factor" data analysis tool in Excel.

The confidence level for the conducted ANOVA was 5% and the tested null hypothesis was as follows:

$$H_0 : \mu_A = \mu_B = \mu_C$$

Results that are presented under **Table 16** shows that the P-value (c. 0%) is less than the confidence level (5%). Statistically, the mean values of VAIC^{TM} observations of the groups differ significantly enough to make a meaningful comparison amongst them.

Table 16 – ANOVA Results for Group A, Group B and Group C

Groups	*Count*	*Sum*	*Average*	*Variance*
Group A	27	155.5	5.8	9.7
Group B	18	56.5	3.1	1.7
Group C	24	73.0	3.0	3.1

ANOVA						
Source of Variation	SS	df*	MS	F	P-value	F crit
Between Groups	117.6	2	58.78	11.08	0.00	3.14
Within Groups	350.2	66	5.30682			
Total	467.8	68				

**degree of freedom*

4.1.2. T-Test Results

Furthermore, a T-test for each pair of groups has been conducted using the "T-test: Two-Sample Assuming Unequal Variances" data analysis tool in Excel.

In the first test, Group A was tested together with Group B with the following null hypothesis.

$$H_0 : \mu_A = \mu_B \quad \text{OR} \quad H_0 : \mu_A - \mu_B = 0$$

The result of this test is provided under **Table 17**, showing the mean values and variances for 18 and 27 observations, along with the degree of freedom (38), the P-value of t-distribution (0.00) under the degree of freedom and the given confidence level of 5%.

Table 17 – T-Test Results for Group A vs. Group B

	Group A	*Group B*
Mean	5.76	3.14
Variance	9.66	1.70
Observations	27	18
Hypothesized Mean Difference	0	
Degree of Freedom	38	
t Stat	3.89	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.02	

As the variances of both groups are different (Group A: 9.66 vs. Group B: 1.70) and given the fact that P-value (c. 0%) is less than the confidence level (5%), we reject the null hypothesis. This reads that statistically, the means of Group A and Group B differ significantly. Hence, a statistically meaningful comparison can be made based on the two groups' VAIC™ observations.

The second T-test was conducted for Group B and Group C, testing for the null hypothesis below under the same confidence level of 5%. Results of this test is presented in **Table 18**.

$$H_0 : \mu_B = \mu_C \quad \text{OR} \quad H_0 : \mu_B - \mu_C = 0$$

Table 18 – T-Test Results for Group B vs. Group C

	Group C	*Group B*
Mean	3.04	3.14
Variance	3.06	1.70
Observations	24	18
Hypothesized Mean Difference	0	
Degree of Freedom	40	
t Stat	- 0.21	
P(T<=t) one-tail	0.42	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.83	
t Critical two-tail	2.02	

The variances of this pair of groups is closer to each other, hence the P-value is much higher (c. 83%) than the confidence level (5%). As a result, we cannot reject the null hypothesis. The mean values of Group B and Group C does not differ significantly, and like that in the previous test, no meaningful comparison can be made based on the two groups' VAIC™ observations.

The final T-test was conducted for Group A and Group C based on the same confidence level of 5% testing for the null hypothesis below.

$$H_0 : \mu_A = \mu_C \quad \text{OR} \quad H_0 : \mu_A - \mu_C = 0$$

The results indicate a P-value (0%) less than the confidence level (5%) as presented in **Table 19**. Based on this we reject the null hypothesis. This reads that the mean values of Group A and Group C differ significantly. Hence a comparison between these two groups can be made based on the mean values of their dataset / VAIC™ observations.

Table 19 – T-Test Results for Group A vs. Group C

	Group A	*Group C*
Mean	5.76	3.04
Variance	9.66	3.06
Observations	27	24
Hypothesized Mean Difference	0	
df	42	
t Stat	3.90	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.02	

4.1.3. Regression Results

Finally, a regression analysis is conducted using Excel to derive a linear relationship between dependent variable VAIC™ and independent variables i) number of members, ii) equity base and iii) age. The complete list of dependent and independent variables is provided in **Annex 1**.

The resulting adjusted R square is 0.34 with a significance level of 0.00 (**Table 20**). While the P value for number of members and equity base are 0.00, for the independent variable age it is 0.96. Hence, age is excluded from the regression line, as it is not significantly related with VAIC™.

The resulting regression line is as follows:

$$\text{VAIC}^{TM} = 3.14 - 0.02 * \text{Number of Members} + 4.00 * \text{Equity Base}$$

Table 20 – Regression Results

Regression Statistics	
Multiple R	0.61
R Square	0.37
Adjusted R Square	0.34
Standard Error	2.12
Observations	69

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	174.83	58.28	12.93	0.00
Residual	65	292.98	4.51		
Total	68	467.81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	3.14	1.15	2.72	0.01
# of Members	- 0.02	0.00	- 3.34	0.00
Equity Base	4.00	1.09	3.66	0.00
Age	0.00	0.02	0.05	0.96

CONCLUSION

Under the scarcity of capital, efficiency has always been important for the investors in order to increase their returns. However, as has been realized relatively recently, the capital is not only composed of the invested funds. Many researchers including Ante Pulic argued that employees' and institutions' know-how are also a type of capital, which is called intellectual capital. While there are a number of methods to calculate efficiency of monetary capital, only a few models have been suggested in order to measure intellectual capital efficiency, and Pulic's VAIC^{TM} is the most widely recognized one.

As the literature review conducted for this study demonstrates, IFI's intellectual capital efficiency had not been studied before. This study's goal was to illustrate if there was a relationship between IFIs membership diversity and their ICE. Currently, there are 23 operational IFIs in the World. These IFIs were divided into three groups by the number of their members and statistical analyses were made based on an enlarged dataset, which included VAIC^{TM} calculations for the entire IFI population.

The results of the ANOVA and T-tests show that groups' means are different from each other (by rejecting the null hypothesis), hence the intellectual capital efficiency is related with the number of members. The Group with the less members (Group A: 2-15 members) has the highest VAIC^{TM} results whereas the Group C (+50 members) has the lowest. This admittedly unexpected result invites a closer look at the notion of intellectual capital as assessed by VAIC^{TM}. The fact that IFIs with more human resources and diversity get lower VAIC^{TM} scores than those with less diversity implies some organizational issues may be at work. It is quite likely that novel measures of efficiency may be needed to assess ICE in the presence of increasing organisational complexity.

Furthermore, despite rather its limited capability to explain the linear relationship (i.e. adjusted R square is 0.34), the regression analysis confirms that VAIC^{TM} is in low negative correlation with the number of members. Additionally, the resulting

regression line suggests that while higher equity base corresponds to higher intellectual capital efficiency, the age of the IFIs is not significantly related with it.

Although the results of this study points towards a negative correlation, further research is needed to evaluate some critical issues. First of all, the VAIC^{TM} model's shortfalls, such as interdependent nature of HC and the inability to produce meaningful results under negative VA, should be addressed. Furthermore, the utility of other statistical methods on relatively small samples like ours should be considered.

While this study suggests a potential negative correlation between the number of IFIs members and their intellectual capital efficiencies, the reasons behind this relation should be a subject for other studies.

Finally, in this study the definition of diversity was limited to the number of members for the sake of simplicity, whereas diversity requires a more complex definition and further analysis should be done in order to assess its effect on intellectual capital efficiency.

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ANNEXES

1. List of Dependent and Independent Variables for Regression Analysis

#	DV VAIC	IV 1 Number of Members	IV 2 Equity Base	IV 3 Age
1	10.00	5	0.96	2
2	4.69	6	0.51	11
3	6.96	8	0.12	42
4	2.26	9	0.36	47
5	3.73	11	0.63	48
6	8.55	11	0.99	41
7	6.81	12	0.98	40
8	1.97	12	0.45	19
9	0.08	15	0.29	57
10	3.04	17	0.41	42
11	2.75	19	0.29	48
12	0.29	27	0.10	58
13	4.96	27	0.56	47
14	4.11	41	0.11	60
15	2.24	48	0.26	58
16	4.29	57	0.46	41
17	1.34	68	0.14	50
18	4.21	69	0.28	25
19	7.32	76	1.00	0
20	2.27	80	0.22	52
21	0.00	177	0.81	39
22	1.75	184	0.25	60
23	2.15	189	0.10	72
24	10.00	5	0.96	3
25	5.20	6	0.47	12
26	5.95	8	0.11	43
27	1.66	9	0.31	48
28	4.30	11	0.64	49
29	10.00	11	0.99	42
30	8.17	12	0.97	41
31	2.83	12	0.50	20
32	10.00	15	0.29	58
33	3.43	17	0.32	43
34	2.54	19	0.29	49
35	4.86	27	0.11	59

#	DV VAIC	IV 1 Number of Members	IV 2 Equity Base	IV 3 Age
36	0.74	27	0.55	48
37	4.33	41	0.12	61
38	2.66	48	0.25	59
39	3.45	57	0.43	42
40	3.16	68	0.28	51
41	3.77	69	0.29	26
42	6.50	76	1.00	1
43	3.05	80	0.22	53
44	2.58	177	0.79	40
45	3.30	184	0.27	61
46	1.50	189	0.10	73
47	8.60	5	0.96	4
48	4.20	6	0.36	13
49	6.14	8	0.11	44
50	1.52	9	0.30	49
51	5.67	11	0.67	50
52	10.00	11	0.98	43
53	4.86	12	0.98	42
54	2.21	12	0.45	21
55	9.08	15	0.30	59
56	3.18	17	0.27	44
57	3.17	19	0.30	50
58	4.84	27	0.11	60
59	2.11	27	0.51	49
60	3.95	41	0.12	62
61	3.35	48	0.25	60
62	2.45	57	0.40	43
63	3.26	68	0.27	52
64	3.08	69	0.26	27
65	5.84	76	1.00	2
66	2.32	80	0.21	54
67	0.00	177	0.79	41
68	3.05	184	0.28	62
69	2.36	189	0.10	74