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INTERNATIONAL CONFERENCE ON ISLAMIC FINANCE

Circular Economy: Towards Impactful, Sustainable and Value-based Intermediation

مركز قطر للمال
Qatar Financial Centre

جامعة حمد بن خليفة
HAMAD BIN KHALIFA UNIVERSITY
كليّة الدراسات الإسلاميّة
College of Islamic Studies

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Hamad Bin Khalifa University (HBKU), a member of Qatar Foundation for Education, Science and Community Development, pursues excellence in education and research through its world class, integrated academic programs and national research capabilities.

By fostering innovation, HBKU is leading positive transformative change in Qatar, and is shaping novel solutions that have global impact.

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COLLEGE OF ISLAMIC STUDIES

HAMAD BIN KHALIFA UNIVERSITY

The College of Islamic Studies (CIS) provides a unique platform that contributes immensely to intellectual debates on Islam in a global context, through its academic programs, centers and its distinguished research division. The college's graduate and PhD programs equip students with the training and skills required to pursue careers in academia and research, as well as in religion, cultural, business, and finance sectors, through specialized tracks that are offered.

CIS offers the following catalog of uniquely crafted programs:

- Doctor of Philosophy in Islamic Finance and Economy
- Master of Arts in Applied Islamic Ethics
- Master of Arts in Islam and Global Affairs
- Master of Arts in Islamic Studies
- Master of Science in Islamic Art, Architecture and Urbanism
- Master of Science in Islamic Finance

Further details on the programs and their admissions requirements are available on the website:

cis.hbku.edu.qa
admissions.hbku.edu.qa

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We mean business

Expand your business to Qatar

Having consistently been ranked as one of the top economies globally in competitiveness, communications and innovation, Qatar boasts one of the strongest and fastest growing economies in the MENA region.

The government's multi-billion dollar investment programme has put the country on a sure footing to further develop its infrastructure and cater to its growing population, in line with the Qatar National Vision 2030 objectives.

Growth in manufacturing, construction, and financial services has lifted the contribution of the non-oil sectors to over half of Qatar's nominal GDP. Additionally, hosting the 2022 FIFA World Cup accelerated Qatar's large-scale infrastructure projects such as its metro system, light rail system, and construction of a new port, roads, stadiums and related sporting infrastructure, all of which is creating numerous business opportunities for professional and business services providers.

INTERNATIONAL CONFERENCE ON ISLAMIC FINANCE

Circular Economy: Towards Impactful, Sustainable and Value-based Intermediation

February 5 – 6, 2020
8:00 am – 5:15 pm

Organized By:

جامعة حمد بن خليفة
HAMAD BIN KHALIFA UNIVERSITY
كليّة الدراسات الإسلاميّة
College of Islamic Studies

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ORGANIZER PROFILE

About Hamad Bin Khalifa University

Hamad Bin Khalifa University (HBKU), a member of Qatar Foundation for Education, Science, and Community Development (QF), was founded in 2010 as a research-intensive university that acts as a catalyst for transformative change in Qatar and the region while having a global impact. Located in Education City, HBKU is committed to building and cultivating human capacity through an enriching academic experience, innovative ecosystem, and unique partnerships. HBKU delivers multidisciplinary undergraduate and graduate programs through its colleges and provides opportunities for research and scholarship through its institutes and centers.

About College of Islamic Studies

HBKU's College of Islamic Studies (CIS) was founded to become a beacon for contemporary Islamic scholarship and thought, and a platform for meaningful intellectual and cultural dialogue on Islam and Muslims. Through its five academic offerings and four research centers, the college seeks to address some of the most pressing questions facing Muslim communities today, both locally and globally. Through its offerings, the college strives to advance a better understanding of Islam and its social dimensions and to produce graduates who can contribute and excel in a rapidly changing world.

About Center For Islamic Economics & Finance

The Center for Islamic Economics and Finance (CIEF) is one of the research arms of the College of Islamic Studies, at Hamad Bin Khalifa University, Doha, that is dedicated to the study of relationships between Islamic faith and economic phenomena and the effect on the behavior of individuals, institutions, and markets by broadly examining Islamic perspectives on production, redistribution and exchange through an interdisciplinary approach. Over the years, CIEF has organized several conferences, namely:

- 8th International Conference on Islamic Economics and Finance (December 2011, Doha)
- 9th International Conference on Islamic Economics and Finance (9-10 September 2013, Istanbul)
- 10th International Conference on Islamic Economics and Finance (23-24 March 2015, Doha)
- Harvard University Muslim Alumni Islamic Finance Conference (October14 & 15, 2016, Cambridge, Massachusetts, USA)
- Harvard University Muslim Alumni Islamic Finance Conference (October 26 & 27, 2018, Cambridge, Massachusetts, USA)
- CIS-QFC Global Conference on Awqaf (4-6 December 2018, Doha)

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INTRODUCTION

Islamic finance has come a long way over the last four decades. In its current transformative decade, Islamic finance is facing the challenge of strategic sustainability, which requires the Islamic finance industry to revisit its operational paradigm.

The challenge can be seen in forms of the growing global landfills crisis, ecological and environmental degradation, climate change, and other environmental stressing factors, which are widely understood to be the by-products of the current linear approach of the world economy. While this approach of 'taking, making, using, disposing and wasting' the planet's resources is the dominant economic paradigm, the laws of ecology, like the water cycle, demonstrate that nature does not ever waste.

With the underlying principles of zero-waste and sustainable agenda, over the last few years, the circular economic system, which explores ways, processes and incentives that aim to minimize and ideally eliminate all types of waste, is gaining global attraction. That being so, what are the prospects of a handshake between Islamic finance and this emerging new paradigm?

Thorough studies and deliberations are needed to explore prospects for economics, finance, business, management and other fields of humanities to learn from nature through the lens of Islamic values along with the multidimensional Sustainable Development Goals of the United Nations (UN SDGs). The circular economy, if applied correctly, can first and foremost help countries like Qatar to fight the risks of climate change by becoming the first GCC country to implement sustainable economy and business model. It also allows companies to get much more value out of the energy resources, materials and other primary sources they use. That additional value can then be deployed to optimize their services, contribute to their clients' return on investment and promote transparent sustainable practices in the communities they operate.

This conference, organized by the Center for Islamic Economics and Finance of the College of Islamic Studies with the support of the Qatar Financial Centre, thus set out to probe and take stock of the existing knowledge and prospects for transforming economies to achieve and sustain multidimensional development by bringing together original papers deliberating on Islamic finance and the circular economy.

The conference convenes scholars, intellectuals and professionals from various academic and industrial disciplines to discuss on the following themes:

1. Islamic Finance and Circular Economy: The Next Frontier For Positive Change
2. Sustainable Financing For Impact & Value Creation
3. Islamic Perspective of Circular Economy & Sustainability
4. Convergence of Islamic Finance & Circular Economy
5. Reimagining Islamic Finance: Demonstrating Impact & Positive Change
6. Circular Economy: Concepts, Models - Challenges and Opportunities
7. Circular Economy Innovations - Case Studies

PARTICIPANTS

Abdul Jalil Ibrahim

PhD Student, College of Islamic Studies, Hamad Bin Khalifa University

Abdul-Jalil Ibrahim is a PhD student in Islamic Finance and Economy at Hamad Bin Khalifa University in Doha, Qatar, where he previously pursued a second Master's degree in Islamic Finance. He earlier received an MSc in Energy Studies from the University of Dundee in 2012, and a BSc. In Business Administration from the Kwame Nkrumah University of Science and Technology, Ghana. He was the lead consultant for a project commissioned by the SNV Netherlands Development Organization in 2018 and has also consulted for the National Entrepreneurship and Innovation Plan in Ghana. He is co-founder of Data Partners and Dar Al-Istithmar (Islamic fund management and investment advisory company based in Accra). Abdul-Jalil has written and presented research papers, co-authored a book on energy sector development in Ghana. His research interest includes sustainability and Islamic finance, climate risks and financial stability, Islamic venture capital and entrepreneurship and application of fintech in Islamic finance.

Abdul Rashid

Associate Professor, International Institute Economics, Pakistan

Dr. Abdul Rashid is currently working as Associate Professor and Chairman, Research at International Institute of Islamic Economics (IIIE), International Islamic University Islamabad, Pakistan. He possesses vast experience of research, teaching, and project leadership in economics, finance, and Islamic banking & finance. He carries a wealth of published research (more than 100 papers). Having received formal training of economics, econometrics, and finance from Pakistan and PhD Economics degree from the University of Sheffield UK in 2012, Dr. Rashid is actively involved in research in Applied Econometrics, International Finance, Corporate Finance, and Islamic Finance and related disciplines. He has published his work in several well-reputed national and international journals. He is also serving as a member of the Editorial Board of several national and International journals.

Abdulazeem Abo Zaid

Associate Professor, College of Islamic Studies, Hamad Bin Khalifa University

Dr. Abdulazeem holds a PhD and an MSc in Islamic Financial Law, three BAs in Islamic Law, Arabic Language and English Literature; two higher studies diplomas in Islamic Law and Human Sciences. His works are published in numerous local and international journals and presented papers at several international finance conferences. His expertise in Islamic Finance is demonstrated by his release of four authoritative books on the Merchant's Directory to Fiqh and Morals published in 2005. Currently, he is the associate professor at the College of Islamic Studies, Hamad Bin Khalifa University.

Adam Ng

Deputy Director, International Centre for Education in Islamic Finance, Malaysia

Adam Ng is Deputy Director at the Research Management Centre and Associate Professor of INCEIF. He has 12 years of unique professional experience ranging from policy and financial infrastructure development, supranational startup institutionalization, tech startup establishment/investment to academic/industry research and boutique consulting. He was Fellow at the London-based Royal Society of Arts (2014-2017), Research Associate at the Oxford's Global Economic Governance Program (2015-2016) and Securities Commission Malaysia-Oxford Centre for Islamic Studies Scholar-in-Residence in Islamic Finance (2014-2015). He received his PhD in Islamic Finance from INCEIF and Bachelor of Civil Law from University of Oxford.

Ahmed Khalaf al-Dikhil

Professor, University of Tikrit, Iraq

Dr. Ahmed Khalaf obtained his PhD in Common Law from the University of Mosul, Iraq, with a distinction in 2010. Ahmed Khalaf worked as a lawyer at the Iraqi courts before taking up academic positions. He has held several positions at the academic level, most notably as a lecturer at the College of administration and economics at Tikrit University, and as a rapporteur of the Department of law at the College of Law. Ahmed Khalaf currently works as a professor at the faculty of law at Tikrit University. He was chosen as a member of several committees, most notably as the member of the Iraqi Bar Association. He has numerous publications on the law and legalities and has supervised many Masters and PhD theses.

Ahmad M. Badreldin

Researcher & Lecturer, Philipps-University Marburg, Germany

Dr. Ahmed Badreldin is currently working as a Researcher and Lecturer at the Philipps- Universität Marburg in Germany at the Finance and Banking Research Group, as well as the Economics of the Middle East Research Group. He obtained his PhD from Marburg University in April 2018 in the field of Asset Pricing with an application to Islamic Finance, and has introduced a course on Islamic Finance at Marburg University with a focus on empirical asset pricing. He has over ten years of teaching experience, having taught at Marburg since 2013, and at the German University in Cairo since 2009.

Ahmet Faruk Aysan

Dean, School of Management and Administrative Sciences, Istanbul Sehir University, Turkey

Ahmet Faruk Aysan received his B.A. in economics from the Bogaziçi University in 1999 and both his M.A. (2001) and his Ph.D. (2005) in economics from the University of Maryland College Park. Dr. Aysan, who served as a consultant at various institutions such as the World Bank, the Central Bank of the Republic of Turkey and Oxford Analytica, has been lecturing at the Department of Economics at Bogaziçi University since 2005. Dr. Aysan's fields of specialization are international finance, macroeconomics, political economy, banking and finance, econometrics, governance and development and he is a member of editorial and advisory boards of several international journals. Dr. Aysan, who has many articles published in academic journals, was awarded with the Bogaziçi University Foundation Publication Awards, and the Ibn Khaldun Prize for the best paper on the North African and Middle Eastern Country Studies granted by Middle East Economic Association. Dr. Aysan has also served at the advisory board of the Contemporary Turkish Studies at London School of Economics and Political Sciences (LSE) European Institute. Dr. Aysan is currently the Dean of the School of Management And Administrative Sciences at the Istanbul Sehir University.

Akber Khan

Senior Director, Al Rayan Investment, Doha, Qatar

Akber has more than 22 years of experience in the investment industry and, since 2009, has been head of asset management at multi-award winning Al Rayan Investment (ARI). He is responsible for more than $1 billion in client assets which are invested in regional listed equities, global sukuk and money markets. At ARI, Akber has overseen the launch of Al Rayan GCC Fund, the world's largest Sharia-compliant GCC fund as well as the QSE-listed, Al Rayan Qatar ETF, the world's largest Sharia-compliant equity ETF. Prior to ARI, Akber was a Director in Deutsche Bank in London where he spent more than 11 years in European and emerging market equities in trading, research and proprietary investment roles. Akber graduated from University College London having read History and Economics. In each year since 2013 he has been in MENA Fund Manager Magazine's 'Power 50' list of the most 'influential, innovative and powerful people' in the regional industry. Akber has lived in Doha, Dubai, Frankfurt, Karachi and London.

Ali Mohiuddin Al-Quradaghi

Secretary-General of the International Union for Muslim Scholars

Dr. Ali has a PhD in Contracts and Financial transactions and Master's degree in Shari'ah and Comparative Fiqh from the University of Al-Azhar. He is currently the Secretary-General of the International Union for Muslim Scholars and Vice-President of the European Council for Fatwa and Research. He was a Professor at the University of Qatar and has published over 100 papers and written over 30 books. Dr. Ali is a prominent Shari'ah scholar serving several Islamic financial institutions worldwide both as chairperson as well as board member of various Shari'ah Supervisory Boards (SSBs).

Amin Mohseni

Assistant Professor, College of Islamic Studies, Hamad Bin Khalifa University

Dr. Amin Mohseni is an assistant professor of finance at the College of Islamic Studies, Hamad Bin Khalifa University. Prior to this, he was an assistant professor at the Department of Economics in American University, Washington D.C. He is also an affiliated scholar with Faculty of Economics and the Faculty of World Studies at the University of Tehran, Iran. His areas of expertise are Development Macroeconomics, Islamic Economics and Finance, Energy Economics, and Economies of the Middle East and North Africa. His research has been published in World Development, Journal of Financial Stability, Journal of Socio-Economics, International Journal of Islamic and Middle Eastern Finance and Management, and Iranian Economic Review among many other journals. Also, he was the developer of World Bank's Global Financial Development Database. He writes frequently on topics related to development economics, Islamic economics and finance, and economies of the Middle East. He holds a PhD in Economics, an M.A. in International Development, and a B.S. in Electrical Engineering.

Brahim Sadouni

Professor, University of Manchester, United Kingdom

Brahim Saadouni is a Professor of Accounting & Finance at Alliance Manchester Business School (AMBS), The University of Manchester. Prior to joining AMBS Brahim worked at the School of Management, the University of Manchester Institute of Science and technology (2000 – 2004) and the University of Hull (1991 – 1999), where he held the position of the Head of the School of Accounting, Business and Finance, and Director of the Centre for International Capital Markets Research. Professor Saadouni has extensive teaching experience both in the UK and overseas. He has delivered workshops and courses in the Middle East and North Africa (Algeria, Bahrain, Kuwait, Saudi Arabia and the United Arab Emirates) and Asia (mainly in Hong Kong, Indonesia, Malaysia, and Singapore). He has also given significant number of workshops in the areas of investment and portfolio management; risk management and corporate finance to practitioners in the UK, Kuwait, Saudi Arabia, United Arab Emirates, Indonesia and Malaysia. Brahim was visiting Associate Professor at the School of Management, Boston University (USA) and also held a Visiting Research Fellowship at Perth Business School (Australia). More recently (2016 – 2017) Professor Saadouni was Visiting Fellow at the School of Banking and Finance, the University of New South Wales, Sydney (Australia).

Dalal Aassouli

Assistant Professor and Coordinator, MSc Islamic Finance Program, College of Islamic Studies, Hamad Bin Khalifa University

Dr. Dalal Aassouli is an assistant professor of Islamic finance at Hamad Bin Khalifa University (HBKU) in Qatar. She was previously a visiting academic at the Durham Centre for Islamic Economics and Finance, Durham University Business School and a visiting lecturer in a number of international universities. Previously, she worked at the International Islamic Liquidity Management Corporation in Malaysia where she assisted with the establishment of the IILM's sukuk program. Before that, she held several positions in Europe where she had exposure to the African, European and Latin American markets. She holds Masters from NEOMA Business School, and Paris Dauphine University and a PhD from ENS de Lyon in France. Her areas of research interest include Islamic finance in general and its implications for corporate finance, ethical finance, development finance, green finance, sustainable development and socially responsible investing.

Eiman I. Hassan

PhD Student, College of Islamic Studies, Hamad Bin Khalifa University

Eiman is a PhD student at College of Islamic Studies (CIS) at Hamad Bin Khalifa University (HBKU); she holds MSc in Islamic Finance and MSc in Environmental Studies. Eiman studied and worked in multilateral disciplines with global exposures; she has a rich work experience in the finance field from USA and then joined the Finance Department at CIS before start working closely with the Islamic Finance Faculty in the capacity of Senior Academic Officer. As for the research interests, Eiman is keen on relating the environmental emerging issues with the economic and financial issues especially Islamic Finance focusing on social and ethical finance, green finance and development finance.

Emad El-Din Shahin

Interim Provost, Hamad Bin Khalifa University
Dean, College of Islamic Studies, Hamad Bin Khalifa University

Dr. Emad El-Din Shahin is the Dean of the College of Islamic Studies (CIS), Hamad Bin Khalifa University, Qatar Foundation. Before joining CIS, he was the Hasib Sabbagh Distinguished Visiting Chair of Arabic and Islamic Studies, a visiting professor of Political Science at the School of Foreign Service at Georgetown University and the editor-in-chief of The Oxford Encyclopedia of Islam and Politics. Shahin holds a PhD (1989) from the Johns Hopkins School of Advanced International Studies, an MA (1983) and a BA (1980) from the American University in Cairo. He has taught in leading universities in the United States including Harvard, Notre Dame, Georgetown, George Washington, and Boston University. His research and teaching interests focus on Islam and Politics, Comparative Politics, Democracy and Political Reform in Muslim societies. Shahin has authored, co-authored and co-edited six books and has more than 50 scholarly publications including journal articles, book chapters and encyclopedia entries. His publications include Political Ascent: Contemporary Islamic Movements in North Africa (1998), co-editorship with Nathan Brown of The Struggle over Democracy in the Middle East and North Africa (2010); and co-authorship of Islam and Democracy (2005 in Arabic). He is the editor-in-chief of The Oxford Encyclopedia of Islam and Politics (2014) and co-editor with John L. Esposito of The Oxford Handbook of Islam and Politics (2013).

Howard Bevan

Director of Energy, Al Attiyah Foundation, Doha, Qatar

Howard Bevan is one of the longest serving employees at the Al-Attiyah Foundation. He is currently Director of Energy and a Senior Advisor to the Board of Trustees on Energy matters. He has followed a long career in the Middle East in a variety of planning, risk management and finance roles in the chemical, oil, gas and water industries. He has played a key role in the planning the development of the oil and gas industries within Qatar.
He is a polymath who holds a variety of qualifications in polymer chemistry, Finance and Econometrics.

Irfan Aleem Qureshi

Chief Economist, Ministry of Finance, Doha, Qatar

Dr. Irfan Aleem Qureshi is an experienced chief economist with a demonstrated history of working in the government administration industry. Prior to his current position with the Ministry of Finance, Qatar, he was the acting chief economist with Shell International Petroleum (1980-1985), the lead economist and advisor to executive director in World Bank (1985-2007), and the Principal Economist in Islamic Development Bank (2007-2015).
Dr. Irfan received both his M.Phil. (1978) and PhD (1986) in Economics from the University of Oxford.

Jameela Mohammed Alshaabi

PhD Student, Istanbul Sabahattin Zaim University, Turkey

Jamila Al-Shaabi is a PhD student in Islamic economics at Istanbul Sabahattin Zaim University. She holds a master's degree from Eastern Michigan University, U.S.A. She is the founder of the Qatar Women's Association for Economic and Investment Awareness and director of a Qatari based human resource company.

Khalid Al-Ansari

PhD Student, College of Islamic Studies, Hamad Bin Khalifa University

Khalid Al-Ansari is a civil engineer who has worked in the oil & gas industry for over 15 years. Over his career, Khalid has held several different roles in the design and supervision of projects dealing with structural stabilities of superstructures within the delicate and environmental sensitivity of chemical plants. After completing a Masters of Business Administration (MBA) degree (with specialization in Strategic Management), Khalid took on increased responsibilities in Qatar Petroleum (QP) as Head of Land & Port Infrastructure. In this position, Khalid was responsible for designing, building and supervising one of the largest ports in Qatar, which was engineered with new network of roads and bridges to facilitate logistics of importing building materials for a booming economy.

After establishing a full department of infrastructure at QP, Khalid was given the task to create an Environment Department. Khalid took on this challenge after he completed a Masters in International Commercial Law (LLM). During the last ten years, Khalid used his experience in Business and Law coupled with Engineering to design, plan, organize, tender, evaluate and execute many successful projects for the protection of environment.

After graduating with Doctor of Law (JD) degree in Hamad bin Khalifa University (HBKU), Khalid had applied to become a lawyer and in parallel, started studying for a PhD in the Islamic Finance and Economy in the College of Islamic Studies of HBKU.

Khelifa Mazouz

Professor, Cardiff University, United Kingdom

Khelifa Mazouz joined Cardiff Business School, as Professor of Finance, in January 2014, following previous full-time academic appointments at Bradford School of Management, Aston Business School and Portsmouth Business School. Khelifa's main research is in the areas of empirical corporate finance (e.g. initial public offerings), market efficiency (e.g. price reaction to shocks) and the interactions between derivatives and stock markets (e.g. the impact of option listing on the market quality of the underlying stocks). He has also been involved in several multi-disciplinary research projects, covering areas such as accounting, international business, human resource management and corporate governance. He has published several articles in world leading academic journals including Journal of Corporate Finance, Journal of Banking and Finance, Journal of Empirical Finance, Journal of Business Ethics, British Journal of Management and Human Resource Management.

Hassan Jummah Al-Mohannadi

Assistant Undersecretary for Environmental Affairs, Minister of Municipality and Environment

Hassan Jummah has more than 19 years of successful experience in managing financial and strategic matters. Hassan Jummah is currently working as the Assistant Undersecretary for Environmental Affairs for the Minister of Municipality and Environment in Qatar. He has previously worked as an electrical engineer at the Ministry of Electricity and Water before serving as CEO in several companies. He is a member of many local and regional committees. Hassan Juma holds a Bachelor's degree from Qatar University in Electrical Engineering, and a Master's degree in Business Administration from Bradford University.

M Evren Tok

Dean for Innovation, College of Islamic Studies, Hamad Bin Khalifa University

Dr. M. Evren Tok is Associate Professor and Assistant Dean for Innovation and Community Advancement, Program Coordinator for Islam and Global Affairs Program at the College of Islamic Studies, Hamad Bin Khalifa University. He is the co-editor of Policy Making in a Transformative State: The Case of Qatar, published by Palgrave MacMillan, 2016. He is the Lead Project Investigator for Qatar National Research Fund Priority Program for 3 years on "Localizing Entrepreneurship Education in Qatar". Dr. Tok has top-notch experience in building disruptive mechanisms in education and learning in post-graduate studies. He is the founder of the first makerspace in Qatar Foundation built around the concept of "Green Economies, Social Innovation and Entrepreneurship".

Marc Vermeersch

Executive Director, Qatar Environment & Energy Research Institute (QEERI), Qatar Foundation

Dr. Marc Vermeersch is the Executive Director of the Qatar Environment and Energy Research Institute (QEERI). He is leading scientific and technology research, development and innovation at QEERI, to tackle Qatar's Energy and Water Security, and Environment Grand Challenges, while also addressing the impact of climate change on the State of Qatar and the region.

With more than 20 years of experience in research and innovation, Dr. VERMEERSCH has joined Qatar Foundation (QF) with first-hand knowledge in research development and deployment (RD&D), as well as manufacturing. Prior to his appointment at QF, he worked at King Abdullah University of Science and Technology (KAUST) as a Professor of Practice and as the Managing Director of the Solar Center. Before joining KAUST, Dr. Marc Vermeersch has been working for more than eight years for the French oil and gas company and for eleven years for the French Group SAINT-GOBAIN.

Professionally, Dr. Vermeersch is a strong team builder, integrator and federative in challenging environments. His wide industrial, technological, and scientific experience at the international level reaffirms his conviction about innovation being a culture that is required for the sustainable progress of companies and institutions, as well as the balanced and harmonious development of research teams.

Mehmet Bulut

Rector, Istanbul Sabahettin Zaim University, Istanbul, Turkey

Dr. Bulut is Professor of Economics and Economic History. He received his PhD from the University of Utrecht (2000) and M.A. from Posthumus Institute (1998) in the field of Economic History and MA and BSc. from Dokuz Eylul University (1994, 1992) in Economics. He began his career as a Research Assistant and became Assistant Professor in 2001, Associate Professor in 2003 and Full Professor in 2008. He has taught at Baskent University and served as Chair of Department of Economics and member of the Board of Directors in Faculty at the same Institution. He began to serve as the Dean of Faculty of Political Sciences and became Vice-President at Yildirim Beyazit University in 2011. He became the member of Turkish Academy of Sciences (TUBA) and was elected by the Rectors of Turkish Universities and appointed by the President of Republic of Turkey to the Board of Council of Higher Education (Turkey) in 2012. Currently, he is the Rector of İstanbul Sabahattin Zaim University. He also served as the member of the Board of Directors in various public and private companies in Turkey.

Meshal Al-Shamari

Director, Qatar Green Building Council, Doha, Qatar

Eng. Meshal Al Shamari has worked in the construction industry for over 13 years, accumulating invaluable experience in project management, leadership and business development. His work as a Lead Project Engineer at Qatar Petroleum proved vital to Qatar's oil and petroleum industry as he successfully led several key projects, including buildings, infrastructure, land development, pipelines, roads and landscaping. Meshal has a Bachelor of Science in Civil Engineering and a Master of Business Administration from Qatar University, and has pursued numerous courses in project management at Arizona State University and University of Texas at Austin. He is a member of SAVE International and of the Project Management Institute (PMI) and has completed a certification courses of Associate Value Specialist (AVS) at SAVE International, LEED and PMP. Meshal has recently completed the Executive Leaders Programme at Qatar leadership Centre and completed modules with Harvard Business School, Duke University, HEC Paris Business School, University of Oxford and University of Cambridge. Meshal became the director of Qatar Green Building Council in 2012. He is dedicated to leading QGBC towards building a culture of sustainability for Qatar and the region by promoting and raising awareness of environmentally and socially-responsible building practices among the industry and the public.

Mohamed Aslam Haneef

Professor, International Islamic University, Malaysia

Mohamed Aslam Mohamed Haneef, Ph.D is currently Professor at the Department of Economics, International Islamic University Malaysia (IIUM). PhD from the School of Development Studies, University of East Anglia, UK. He has published books and articles and conducted research in various areas of Economics, Development Studies and Islamic economics including Co-editor of Islamic Economics: Principles and Applications (ISRA, 2018). His current research interests is in philosophical issues in economics, socio-economic impact of awqaf and social economics/finance. He is jointly heading Islamic microfinance project called 'I-Taajir'. Executive Committee Member, International Association for Islamic Economics (IAIE), 2012 to date and International Council of Islamic Finance Educators (ICIFE), 2014 -2019.

Mohamed El-Gammal

Associate Professor, College of Islamic Studies, Hamad Bin Khalifa University

Dr. El Gammal is Associate Professor of Comparative Fiqh at CIS - HBKU. Previously he was an Assistant Professor at the College of Law in Al-Azhar University. He is a prolific author, and his writings are widely read in the Arabic academia. He has participated in various conferences, and his research interests lies in the areas of Islamic Contemporary Fiqh, Fatwa and its Contemporary Issues, Islamic Banking, Renewal of Islamic Political Fiqh and related areas.
He holds a PhD (2005) and a Master degree (2002) in Comparative Fiqh from Al-Azhar University, Egypt, and a BA (1996) in Shariah and Law from Al-Azhar. Before joining CIS, he has been teaching comparative fiqh at Al Azhar University

Mohammed Khalid Al-Sharshani

Acting Head, Conservation & Technology, Tarsheed – Kahramaa

Eng. Mohammed Khalid Al-Sharshani is the acting head of conservation & technology at Qatar General Electricity & Water Corporation (Kahramaa). He started his career as a project engineer (renewable energy), and now leads the technical team & DSM for projects in line with Qatar's Supreme Committee for Delivery & Legacy 2022. He is an active member and speaker at many national and international forums on Energy and renewable energy forums, like GORD - GSAS (2017), QGBC (2018), EU-GCC Clean Energy Tech Network, and world green energy forum 2018. Mohammed holds a bachelor's degree in Electrical & Electronic Engineering (UK-2014). His interests lies in studying & developing energy diversification strategies through the impact of awareness, conservation laws & regulations in Qatar.

Mubarak Mohammed Kabir Musa

MSc Student, College of Islamic Studies, Hamad Bin Khalifa University

Mubarak Mohammed Kabir Musa is a master student in the Faculty of Islamic studies at the university of Hamad bin Khalifa (HBKU). In 2011, He received his Bachelor in Principles of Islamic Jurisprudence in the department of Islamic jurisprudence from Kuwait University, Kuwait. During his graduate study, Mubarak Focuses on Islamic Capital Market where he assesses the conformity of several products to Islamic precepts and attempts to offer recommendations and solutions. He is currently a student research assistant at the research division at Hamad bin Khalifa University.

Mustafa Disli

Assistant Professor, College of Islamic Studies, Hamad Bin Khalifa University

Mustafa Disli is an Assistant Professor of Economics and Finance at HBKU's College of Islamic Studies. He received a B.A. in Economics (2002), a M.A. in Economics (2003), a M.A. in Banking and Finance (2004), and a PhD (2013) from Ghent University. Dr. Disli's research interests are in the areas of banking, corporate finance, behavioral finance and Islamic finance. He has published across a number of international peer-reviewed journals, including Economic Modelling, Energy Economics, Journal of Comparative Economics, Journal of Financial Services Research, and Journal of Financial Stability.

Muhammad Tahir Jan

Associate Professor, Kulliyyah of Economics and Management Sciences, International Islamic University, Malaysia

Muhammad Tahir Jan has a PhD in Business Administration (Marketing). He has a vast experience in teaching marketing related subjects and presentation skills to the students of different caliber, including; training executives of different organizations. Dr. Tahir prefers to publish in the area of consumer behavior and has published in various accredited journals. His research has also been presented in conferences both locally and internationally. Due to his research capabilities, he was given "Best Researcher Award" for the year 2014 and "Best Indexed Journal Article Award" for the year 2015, at the Department of Business Administration, Kulliyyah of Economics and Management Sciences, International Islamic University Malaysia. Presently, Dr. Muhammad Tahir Jan is an Associate Professor of Marketing and a Seminar Coordinator at the Department of Business Administration, Kulliyyah of Economics and Management Sciences, International Islamic University Malaysia. He is also a leader of the faculty's sustainable development goals project.

Tariq Majeed

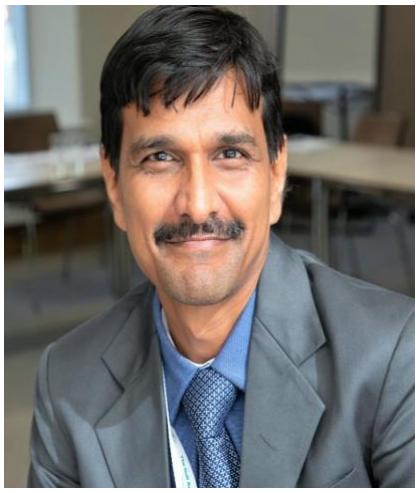
Associate Professor, Quaid-i-Azam University, Pakistan

Mr. Majeed is working as Associate Professor of Economics in Quaid-i-Azam University, Islamabad, Pakistan. He did his PhD in Economics from the University of Glasgow, UK in 2012. He has published many research papers in national and international journals. He has written chapters in seven different research books. Moreover, he has presented his research at various international forums such as Royal Economic Society and Scottish Economic Society. He has more than 15 year research supervision experience. His research interests include: Islamic economics, financial development, corruption, inequality, poverty and economic growth.

He has also worked as Research Associate in Punjab Economic Research Institute; Assistant Director in National Tariff Commission of Pakistan; Lecturer in University College Islamabad; Alama Iqbal Open University. He has also worked as research consultant with International Growth Center, HEC, Planning Commission, SDPI and Lead. Moreover, he has delivered various capacity building trainings related to applied research in social sciences. He has delivered honorary lectures to the executives of Intelligence Bureau, Civil Servants, MNAs and Senators.

Nafis Alam

Professor, Asia Pacific University, Malaysia



Prof Alam is currently working as a Professor of Finance and Head of School of Accounting and Finance at Asia Pacific University of Technology and Innovation (APU). He previously served as an Associate Professor of Finance at Henley Business School Malaysia and at Nottingham University Business School. His scholarly articles have been published in leading journals including The World Economy, Emerging Markets Review, Pacific-Basin Finance Journal, Journal of Asset Management, Journal of Banking Regulation among others. He has also co-authored seven books on Islamic Finance. He was featured as a Professor of the Month by Financial Times (FT) in 2014 and received an award for Upcoming Personality in Islamic Finance in 2016 presented by GIFA and hosted by the Indonesian government. He is an avid writer and contributes regularly to the mainstream newspaper, economic forum and professional outlets like WEF, Huffington Post, The Edge, The Conversation among others. He is one of the top influencers in the area of Fintech, Banking regulation, financial Inclusion and Islamic finance.

Nasim Shah Shirazi

Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University

Dr. Shirazi has experience of more than 37 years in the areas of teaching, research, consultancy, and administration. He served at the International Institute of Islamic Economics (IIIE), International Islamic University, Islamabad (IIUI) and the International Islamic University, Kuala Lumpur, Malaysia (IIUM) in the capacity of the professor. He has worked as Deputy Dean (Suleyman Demirel University, Almaty), Dean, Director Research and Director General, IIIE,IIUI. He has designed, developed and taught courses at the graduate and post-graduate level in the field of Economics, Islamic Economics and Decisions Sciences both at the National and International Universities. With more than 76 publications, Dr. Shirazi is well respected for his research in the areas of development economics and Islamic Finance for social development. Besides the academic excellence, Dr. Shirazi has completed several consulting assignments with the World Bank, Asian Development Bank, PPAF and private organizations. Dr. Shirazi is also active in community services and currently act as a member of the editorial boards of IRTI Journal: Islamic Economic Studies and Journal of King Abdul Aziz University: Islamic Economics, Pakistan Journal of Contemporary Sciences and Pakistan Journal of Management & Social Sciences.

Omar Javaid

Assistant Professor, Institute of Business Management, Pakistan

Dr. Omar Javaid got his PhD in Socially Sustainable Entrepreneurship from IoBM in 2018, has a BE in Industrial & Manufacturing Engineering from NED University, Executive MBA from IoBM with majors in Marketing and MS in Management Sciences with majors in Islamic economics and finance from KIET. Mr. Javaid has a total of 11 years of experience of working in corporate, education and non-profit sector including serving for an interest free micro-finance organization called GEAR in a voluntary capacity. He has also published various research articles and editorials in various journals, magazines and newspapers; and is a reader of Islamic Economics & Finance, Micro-finance & Entrepreneurship, Social Entrepreneurship, Political Theory, and Philosophy of Economics and Business Management.

Omer Mahgoub Mohamed El Hussien

Head Auditor, Qatar Amiri Guard

Omar Mahgoub received his PhD with distinction from Omdurman Islamic University, Sudan, in 2017. His career began in 1992 as an employee of the Northern Islamic Bank in Sudan and then worked in several institutions before he served as the first auditor and head of the Emiri Guard Audit Office from 2007. He is also a lecturer at the Directorate of finance and at the Emiri Guard School. Omar Mahgoub is an important member of several committees, like the Emiri Guard Allowances Committee, the Financial Programs Development Committee and others. He was chosen in 2015 as one of the best accountant in the Qatar Accountants Club.

Omneya Abdelsalam

Associate Dean of Research & Impact | Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University

Professor Omneya Abdelsalam is a professor of Accounting and Islamic Finance and the associate dean for research HBKU. She is the founding director of the Sustainable Development Goals Network and the founding director of the Centre for "Ethical Finance, Accountability & Governance" at Durham University. She is a subject editor at Journal of International Financial Markets, Institutions and Money. She is also the Associate Editor of Sustainability, Accounting, Management and Policy Journal. She has published in top internationally ranked journals such as the journal of Business Ethics, Journal of Banking & Finance & Journal of Economic Behavior and Organization. She has more than three decades of academic experience (teaching and research) in various universities in the UK and overseas. Her teaching and research covers sustainable finance, business ethics, corporate accountability, corporate social responsibility and corporate governance. She has also supervised numerous PhD, MSc & MBA students. She received the Award of excellence in teaching from Aston University in 2005 and has been a fellow of the UK Higher Education Academy since 2004. Her contribution to university was recognized by receiving the Award for Innovation & Inspiration from Aston University, Birmingham UK in 2009.

Raghavan Seetharaman

Group Chief Executive Officer, Doha Bank, Qatar

Dr. R. Seetharaman, Chief Executive Officer of Doha Bank, is a recipient of six doctorates including three PhD's from leading universities in the world. Dr. Seetharaman was recognized and conferred by the Government of India with the prestigious Pravasi Bharatiya Samman Award [PBSA] by Hon'ble President of India - the highest honor conferred on overseas Indians.

Dr. R. Seetharaman was honored with the "Green Economy Visionary Award" in 2016 by Union of Arab Banks in Rome, and was also honored the "Global Excellence Award in Renewable Energy 2017" by the Minister of Environment, Govt. of India. Being a high profile economist, he is invited on a regular basis by international media such as BBC, CNN, FOX, CNBC, Sky News, ABC and Bloomberg to share his views. He is a Chartered Accountant and holds certificate in IT systems and Corporate Management, whilst being a Gold medalist in his graduation Bachelor of Commerce.

Salah Gueydi

Director of Tax at the Qatar Financial Center (QFC) Authority

Salah Gueydi is the Director of Tax at the Qatar Financial Center Authority. He also worked as an international tax expert on many technical assistance projects and as an adviser for a number of jurisdictions, including in the MENA region. In these capacities, Mr. Gueydi has been in charge of drafting and reviewing tax laws and regulations, negotiating international tax treaties and giving legal opinions to taxpayers and government agencies. He also participated (as a representative of the State of Qatar) to international tax-related events such as the annual meetings of the UN Committee of Experts in International Cooperation on Tax Matters where he worked on the update of the UN model tax convention. His main contribution focused on the treatment of Islamic financial instruments under the model.

Mr. Gueydi holds a MSc in Islamic Finance and is a PhD student in the Islamic Finance and Economics program of HBKU.

Salman Ali

Assistant Professor, Indian Institute of Management Raipur, India

Prof. Salman Ali is a faculty in Business Policy & Strategic Management Area at the Indian Institute of Management Raipur. He obtained his PhD from the Indian Institute of Management Ahmedabad specializing in the domain of Strategy and International Business. His major research interests include internationalization and re-internationalization of firms, firm movements from developed to emerging economies and vice-versa, strategies and challenges in emerging markets, strategy and innovation, corporate diversification strategy, and financing of sovereign developmental activities. He graduated in Instrumentation and Control Engineering with First Rank from Calicut University. He has over ten years of experience across industry and academia including roles such as Branch Director at Universal Business Links India (H.O. United Kingdom), Lecturer at MES College of Engineering, and R&D Engineer at EG Kantawalla Pvt. Ltd.

Salwa Hamed Al Mulla

PhD Student, College of Islamic Studies, HBKU
Technical Expert, State Audit Bureau, Office of the Vice President, Qatar

Salwa is a PhD student of Islamic economics and finance at the College of Islamic Studies, Hamad bin Khalifa University. She holds a master's degree in public policy in Islam from Hamad bin Khalifa University and a Bachelor's in Management and Economics - Business Administration - from Qatar University. Salwa works as a technical expert in the Office of the Vice President at the Audit Bureau in Qatar. She won many awards in the field of financial control, accounting and others. She has published a book titled "The Role of Leadership in Crisis Management".

Syed Nazim Ali

Director, Research Division & Center of Islamic Economics & Finance
College of Islamic Studies, Hamad Bin Khalifa University

Dr Ali has spent the last thirty years spearheading interdisciplinary research in Islamic finance and faith-based initiatives in finance as well as community development. He was the Founding Director of the Islamic Finance Program (IFP) at Harvard Law School, Harvard University since 1995. He has paid special attention to lines of inquiry that seek to examine and interrogate the frontiers, facilitate research and encourage dialogue among various stakeholders and external discussants. He has played a lead role in organizing several conferences and seminars by observing global trends creating forums for intellectual debates. Some of Dr Ali's most significant contributions to the field have been the Islamic Finance Databank: an online information source in the field; LSE (London School of Economics) Workshop: an annual event to discuss the current pressing issues facing the field, since 2018 it is now being held at SOAS (School of Oriental and African Studies); and the Harvard University Forum on Islamic Finance, the proceedings of which are published under his editorship. Islamic Finance and Development (2014) is the most recent title in this series. In addition, he has published several papers and monographs, the most recent ones are, Takaful and Islamic Cooperative Finance: Challenges and Opportunities (Edward Elgar, 2016) and Shari'a-Compliant Microfinance (Routledge, 2012).

Tariqullah Khan

Professor, College of Islamic Studies, Hamad Bin Khalifa University

Dr. Tariqullah Khan joined HBKU in 2009. He is a Professor and Coordinator of the College of Islamic Studies' Islamic Finance program and he is also a member of the College's Executive Committee. Previously, he worked in the Islamic Development Bank, IRTI since 1984 in different academic and managerial positions, lastly as the Division Chief of Islamic Banking and Finance, officiating Division Chief Islamic Economics and Development Cooperation, and was Editor of the Islamic Economic Studies Journal. He initiated and implemented a number of global strategic initiatives for the development of Islamic finance. He worked in a number of international advisory teams and working groups concerning the development of Islamic financial services. He has contributed with over 25 highly cited research papers in different areas of Islamic finance and developed a number of international flagship conferences in these areas. He has led the CIS academic team in organizing three mega international research conferences during the last four years and coordinated the publication of seven volumes of proceedings. He has twice been elected President of the International Association for Islamic Economics. He also serves in the Editorial/Advisory Board of two leading journals in Islamic economics and finance.

Valeed Ahmad Ansari

Dean and Professor, Department of Business Administration, Aligarh Muslim University, India

Prof (Dr.) Valeed Ahmad Ansari, is Dean Faculty of Management Studies and Research, Aligarh Muslim University. He holds MA in Economics, MBA and Ph.D. in the area of Finance. His research interests include Asset pricing, Behavioral Finance, Corporate Governance and Islamic Banking and Finance. He has published papers in national journals of repute such as Vikalpa and Margin and in international Journals like The Journal of Risk Finance, International Journal of Financial Markets and Derivatives and Managerial Finance. He also edited Islamic Economic News Bulletin during 1991-1994. He has published more than 50 research papers.

Vedat Akgiray

Professor, Boğaziçi University, Turkey

Vedat Akgiray is currently a Professor of Finance and Director of the Center for Corporate Governance at Bogazici University in Istanbul, Turkey. He directed the doctoral program in finance from 1992 to 2009, the M.S. Program in Financial Engineering from 2002 to 2009. He has advised more than eighty graduate students, published and presented more than one hundred academic papers. From 2009 to 2013, he served as the Chairman of the Capital Markets Board of Turkey. He led the team designing and writing the new Capital Markets Law of 2012. During his tenure at the CMB, he also served on the IOSCO Board, the FSB of G20, and the Monitoring Board of the IFRS Foundation. He actively participated in re-designing the international regulatory architecture after the 2008 crisis.

His current interests are in economic-value-based corporate governance, digital disruptions in finance, and pension systems. His new book “Good Finance” studies the causes of financial crises and proposes ways to transform finance into a “humane” discipline. The basic problem globally is that economic and political elite are occupied more with the question of “how?” than with “why?”

Yousuf Al-Jaida

Chief Executive Officer, Qatar Financial Centre (QFC) Authority

Yousuf Mohamed Al-Jaida was appointed Chief Executive Officer of the Qatar Financial Centre (QFC) Authority in June 2015. He previously held the role of Deputy Chief Executive Officer and Chief Strategic and Business Development Officer at the QFC where he was responsible for the overall strategic development. Yousuf has a strong financial background with experience across a variety of roles. He represents the QFC Authority on the boards of the Qatar Exchange, the Qatar Finance and Business Academy, the Financial Markets Development Committee and the Free Zones Authority. He also sits on the Advisory Council of Qatar University's College of Business & Economics.

CONFERENCE AGENDA

CONFERENCE AGENDA

Day 1 – February 5, 2020

8:00 am – 9:00 am	**REGISTRATION AND NETWORKING**
9:00 am – 10:00 am	**WELCOMING REMARKS**
	Dr. Emad El-Din Shahin Interim Provost, Hamad Bin Khalifa University Dean, College of Islamic Studies, Hamad Bin Khalifa University **Keynote Addresses:** **Mr. Hassan Jummah Al-Mohannadi** Assistant Undersecretary for Environmental Affairs, Ministry of Municipality and Environment **Mr. Yousuf Jaidah,** Chief Executive Officer, Qatar Financial Centre (QFC) Authority **Dr. Marc Vermeersch** Executive Director, QEERI – Qatar Environment and Energy Research Institute, Qatar Foundation **Dr. Raghavan Seetharaman** Group Chief Executive Officer, Doha Bank, Qatar **Dr. Mehmet Bulut** Rector, Istanbul Sabahettin Zaim University Istanbul, Turkey **Sheikh Prof. Ali Al-Quradaghi** Secretary-General of Muslim Scholars Union, Qatar
10:00 am – 10:15 pm	**BREAK**
10:15 am – 12:00 pm	**SESSION I: ISLAMIC FINANCE AND CIRCULAR ECONOMY: THE NEXT FRONTIER FOR POSITIVE CHANGE**
	Moderator: **Dr. Muammer Koç** Professor and Head, Division of Sustainable Development College of Science and Engineering, Hamad Bin Khalifa University **Panelists:** **Dr. Mehmet Bulut** Rector, Istanbul Sabahettin Zaim University, Istanbul, Turkey **Dr. Irfan Aleem Qureshi** Chief Economist, Ministry of Finance, Doha, Qatar **Eng. Meshal Al-Shamari** Director, Qatar Green Building Council, Doha, Qatar **Mr. Howard Bevan** Director of Energy, Al Attiyah Foundation, Doha, Qatar

	Mr. Mohammed Khalid Al Sharshani Acting Head of Conservation Technology, Kahramaa **Mr. Akber Khan** Senior Director, Al Rayan Investment, Doha, Qatar
12:00 pm – 1:00 pm	**LUNCH AND PRAYER BREAK**
1:00 pm – 3:15 pm	**SESSION II: SUSTAINABLE FINANCING FOR IMPACT AND VALUE CREATION**
	Moderator: **Dr. Nasim Shirazi** Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University ▸ **Good Finance and Impact Investing** **Dr. Vedat Akgiray,** Professor, Boğaziçi University, Tukey ▸ **Determinants of Firms' Sustainable Development Goals Performance: Evidence from Qatar and Global Firms** **Dr. Omneya Abdelsalam,** Associate Dean and Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University ▸ **Islamic Blended Finance for Impactful SMEs to Achieve SDGs** **Dr. Tariqullah Khan,** Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University ▸ **Sustainable Development and Blockchain** **Dr. Ahmet Faruk Aysan,** Dean, School of Management and Administrative Sciences, Istanbul Sehir University, Turkey ▸ **Value Creation and Unethical Corporate Donations** **Dr. Khelifa Mazouz,** Professor, Cardiff University, United Kingdom ▸ **Sustainability and Private Equity in the GCC: The Case of Shari'a Compliant and Non Shari'a Compliant Investment** **Dr. Brahim Sadouni,** Professor University of Manchester, United Kingdom
3:15 pm – 3:30 pm	**PRAYER BREAK**
3:30 pm – 5:15 pm	**SESSION III: CONVERGENCE OF ISLAMIC FINANCE AND CIRCULAR ECONOMY**
	Moderator: **Dr. Tariqullah Khan** Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University ▸ **Bringing Islamic Finance Home Through the Circular Economy Social Finance Discourse** **Dr. Mohamed Aslam Haneef,** Professor, International Islamic University Malaysia ▸ **Circular Economy Financing: Islamic Finance Perspective** **Dr. Nafis Alam,** Professor, Asia Pacific University, Malaysia

- **Circular Economy, Green Economy, and Sustainable Development: Establishing the Interconnections and Discoursing the Role of Islamic Finance**
  Dr. Abdul Rashid, Associate Professor, International Institute Economics, Pakistan
- **Transparency and Investment Recommendations for Islamic Investment Accounts: An Empirical Analysis**
  Dr. Ahmed M. Badreldin, Researcher and Lecturer, Philipps – University Marburg, Germany

END OF DAY 1

CONFERENCE AGENDA

Day 2 – February 6, 2020

8:00 am – 8:30 am	**REGISTRATION AND NETWORKING**
8:30 am – 10:30 am	**SESSION IV: ISLAMIC PERSPECTIVE ON CIRCULAR ECONOMY AND SUSTAINABILITY**
	Moderator: **Dr. Dalal Aassouli** Assistant Professor and Coordinator, MSc Islamic Finance Program, College of Islamic Studies, Hamad Bin Khalifa University ▸ **Islamic Perspective on Circular Economy** **Dr. Ali Al-Quradaghi,** Secretary – General of Muslim Scholars Union, Qatar ▸ **Islamic Perspective on Environment and Sustainable Development** **Dr. Abdulazeem Abo Zaid,** Associate Professor, College of Islamic Studies, Hamad Bin Khalifa University **Dr. Mohammed Gammal,** Associate Professor, College of Islamic Studies, Hamad Bin Khalifa University ▸ **The Impact of Islamic Methodology of Sustainability and Circular Economy on Qatar National Vision 2030** **Dr. Omer Mahgoub Mohamed El Hussien,** Head Auditor, Qatar Amiri Guard ▸ **A Multi-layer Analysis and Solution for Climate Crisis: From the Restructuring of Production to the Restructuring of Knowledge** **Dr. Omar Javaid,** Assistant Professor, Institute of Business Management, Pakistan ▸ **Sustainability and Profitability: Can Adherence to Ethical Codes Make Decision Making Easier?** **Dr. Salman Ali,** Assistant Professor, Indian Institute of Management Raipur, India
10:30 am – 10:45 am	**BREAK**
10:45 am – 12:15 pm	**SESSION V: REIMAGINING ISLAMIC FINANCE: DEMONSTRATING IMPACT AND POSITIVE CHANGE**
	Moderator: **Dr. Evren Tok** Associate Dean for Innovation, & Associate Professor of Public Policy, College of Islamic Studies, Hamad Bin Khalifa University ▸ **The Impact of Sustainable Banking Practices on Banks' Stability** **Dr. Adam Ng,** Deputy Director, INCEIF, Malaysia ▸ **Social Responsibility of Islamic Banks via Circular Economy Projects** **Dr. Ahmed Khalaf al-Dikhil,** Professor, University of Tikrit, Iraq ▸ **Solving the Problem of Water and Sanitation in Nigeria Through the Use of Blended Finance** **Mr. Abdulrahman Olukade,** MSc Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University **Ms. Jainaba Kolley,** MSc Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University **Mr. Mubarak Mohammed Kabir Musa,** MSc Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University

	▸ **ESG Analysis, Corporate Governance and Shari'a Screening: Mutual Learnings for a Better Investment Climate** **Dr. Valeed Ahmad Ansari,** Dean and Professor, Department of Business Administration, Aligarh Muslim University, India **Dr. Shariq Nisar,** Professor, Rizvi Institute of Management and Research, Mumbai, India
12:15 pm – 1:15 pm	**LUNCH AND PRAYER BREAK**
1:15 pm – 3:00 pm	**SESSION VI: CIRCULAR ECONOMY: CONCEPTS, MODELS – CHALLENGES AND OPPORTUNITIES**
	Moderator: **Dr. Syed Nazim Ali** Director, Center for Islamic Economics and Finance and Research Division, College of Islamic Studies, Hamad Bin Khalifa University
	▸ **The Concepts, Challenges and Opportunities of Circular Economy** **Ms. Salwa Hamed Al Mulla,** PhD Student & Technical Expert, Office of the Vice President, State Audit Bureau, Qatar ▸ **A Consumer Perspective of the Circular Economy: An Empirical Investigation Through Structural Equation Modelling** **Dr. Muhammad Tahir Jan,** Associate Professor, Kulliyyah of Economics and Management Sciences, International Islamic University Malaysia ▸ **Financial Development and Ecological Footprint in OIC Countries Islamic Perspectives and Empirical Evidence** **Dr. Muhammad Tariq Majeed,** Associate Professor, Quaid-i-Azam University, Pakistan ▸ **Educational Designs, Innovation and Circular Economy in the Muslim World** **Dr. Evren Tok,** Associate Dean for Innovation, & Associate Professor of Public Policy, College of Islamic Studies, Pakistan
3:00 pm – 3:15 pm	**PRAYER BREAK**
3:15 pm – 5:00 pm	**SESSION VII: CIRCULAR ECONOMY INNOVATIONS – CASE STUDIES**
	Moderator: **Dr. Mostafa Disli** Assistant Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University
	▸ **Circular Economy in Qatar: Case Study of Used Tires** **Mr. Khalid Al-Ansari,** PhD Student, College of Islamic Studies, Hamad Bin Khalifa University **Dr. Tariqullah Khan,** Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University

	▸ **Electronic and Electrical Waste Management: Sweden and Malaysian Experiences** **Ms. Eiman I. Hassan,** PhD Student, College of Islamic Studies, Hamad Bin Khalifa University **Dr. Nasim Shirazi,** Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University
	▸ **The Role of Islamic Finance in Fostering Circular Business Investments: The Case of Qatar** **Mr. Abdul Jalil Ibrahim,** PhD Student, College of Islamic Studies, Hamad Bin Khalifa University **Dr. Nasim Shirazi,** Professor of Islamic Finance, College of Islamic Studies, Hamad Bin Khalifa University
	▸ **Circular Economy and Development** **Mrs. Jameela Mohammed Alshaabi,** PhD Student, Istanbul Sabahattin Zaim University, Turkey
5:00 pm – 5:15 pm	**SESSION VIII: CLOSING REMARKS**
	Dr. Syed Nazim Ali Director, Center for Islamic Economics and Finance and Research Division, College of Islamic Studies, Hamad Bin Khalifa University
	END OF CONFERENCE

CONFERENCE
ABSTRACTS | PAPERS

SESSION II:

SUSTAINABLE FINANCING FOR IMPACT AND VALUE CREATION

Good Finance and Impact Investing

Vedat Akgiray

Since 1980s, misoriented waves of deregulation led to a giant and problematic industry of finance, size of which cannot be explained by any real economic measure. There is too much debt and too little equity in corporate, household and public finances. Too much debt is a call for defaults, crises, and subsequent social trauma. The financial system has become too complex and opaque, hindering good corporate governance and effective supervision. As a result, finance has evolved into a self-serving complex system sustainable only through a continually increasing supply of credit. After a decade into the global financial crisis, all and even more of the reasons that led to the crisis are still much alive today, and academia and policy makers still resist to update their mindsets and tools. More scaringly, people's trust in finance and governments' handling of financial systems has been eroded. Unless we reset our concept of finance to serve its essential purposes for the good of the whole society, the future of global social order will be under a continual threat of chaos.

Determinants of Firms Sustainable Development Goals Performance: Evidence from Qatar and Global Firms

Omneya Abdelsalam

In this paper we analyse the Sustainable Development Goals performance of a global sample of 4,643 firms (34,177 firm year observations) across 43 countries. Our empirical investigation indicates that firm size, visibility, stability and profitability are contributing factors to superior performance towards the SDGs. We document a negative relationship between institutional ownership and SDG performance, which is also persistent across most of the individual SDG Goals (apart from SDG#16). We find the effect of institutional ownership becomes more pronounced in countries with high investor and legal protection. With regards to the type of the ultimate shareholder, we document that a positive (negative) relationship with SDG performance when the ultimate shareholder is the government (private). Another important aspect of our analysis is the significantly positive relationship between SDG performance and country governance indicators (i.e., rule of law, regulatory quality, and voice and accountability). Finally, we document an interesting change in the determinants of SDG performance after 2016 (the year the SDGs come into effect).

Sustainability and Private Equity in the GCC: The Case of Shariah Compliant and Non Shariah Compliant Investment

Brahim Saadouni

Private equity (PE) in the Gulf Cooperation Council (GCC) region is a new asset class that has been informally structured and formalized towards the beginning of the last decade (early 2000). New private equity firms were established with more generic private equity funds established in 2002 and 2003. No publicly available private equity performance data are available that can shed light on how the GCC region compares to other regions in the world. This paper examines the performance of private equity general partners domiciled in the GCC over the period from 2004-2014. Our proprietary data covers a sample of 306 PE portfolio companies directly from general partners in the GCC. There are no mandatory requirements for PE companies to disclose any data relating to the performance of their investments. Within the sample of 306, 86 companies (28%) were Shariah compliant, with a total investment amount of US$814 million. We examine the relationship between the Internal Rate of Return (IRR) and a number of variables (investment ticket size, sector of investment, location of investment, investment-holding period, Shariah-compliant and conventional investments, and legal type of investments). Our results show that the Shariah compliant investments generate an average annual investment return of 1.13%. This compares unfavorably with the conventional portfolio of investments (220 companies with total investment amount of US$3.18 billion) with an average annual investment return of 2.04%. These findings show that Shariah compliant PE investments underperform their conventional counterparts by 0.91%. This finding is consistent with the findings relating to the underperformance of Islamic mutual funds' when compared to the conventional mutual funds (Merdad, Hassan and Alhenawi, 2010). Furthermore, we analyse the performance of private equity General Partners (GPs) using the IRR, and our results show that only the investment holding period is statistically significant. We also compare the performance of the private equity portfolio to the S&P GCC Composite Total Return Index over the period of 2004-2014, and we find that the private equity portfolio underperformed the index by an average of 2.37% per annum. Overall, our findings show that private equity, as an asset class in the GCC region does not provide higher investment returns

than public equities and the Shariah compliant ones underperform their conventional counterparts. These findings can be used as a basis to explore other areas relating to the private equity industry in the GCC region, such as examining if there is any relationship between PE performance and the possession of GCC experience by investment managers with the GPs, or if there is any relationship between the incentive structure of Shariah GPs and the performance of PE.

Islamic Blended Finance for Impactful SMEs to achieve SDGs

Tariqullah Khan

In this research, we discuss pertinent macro-perspectives and adopt a financial engineering approach to design financial products by blending the motives of compassion, profits and facilitation, that underlie respectively, the philanthropic, commercial and public sector activities. Financial contracts could be incentive compatible and effective if these three motivations are recognized and brought together. The purpose of our research is to offer such incentive-compatible structures that can mobilize funding for socially responsible and impactful SMEs, save cost as well as generate revenue for self-sustainability. Since the blended nature of the contract provides a social subsidy to fund the cost element of the financing, the proposed structure creates a win-win result for the blending parties. While financial institutions expand into the SME sector for profitability, blended Islamic finance is expected to attract additional resources towards enhancing development impact. Through the philanthropic component, SMEs, on the other hand, will access the source of social subsidy that will relieve the burden of the exorbitant commercial rates. The funding structure is also expected to reduce risk perception and spur growth. Consequently, this will contribute to achieving multidimensional human development, as enshrined in the Maqasid al-Shariah, and Sustainable Development Goals (SDGs). Impactful business must integrate environmental, social and governance best practices as well as national development goals. Hence the proposal offers a number of benefits.

Sustainable Development and Blockchain

Ahmet Faruk Aysan

Achieving the Sustainable Development Goals (SDGs) by 2030 is undoubtedly one of the biggest challenges of the 21st century facing both developed and developing countries alike. Since the adoption of the SDGs in 2015, it has been a 5-year journey of trial and error experimentations all over the world to come up with innovative solutions beyond business-as-usual and get the job done. In this paper, we are looking at blockchain beyond the hype. While the technology has a promising potential to trigger disruptive innovations to fulfill the SGDs, it is not mature yet with many gaps in terms of approaches and tools to develop blockchain use cases, monitor and evaluate blockchain experiments, mitigate associated risks and ethical considerations while managing changes within organizations leading blockchain powered platforms. It is only by filing these gaps that blockchain can deliver its promises and may be effectively used as an SDG accelerator. We propose an integrated approach to use blockchain based solutions as SDG accelerators. One of the experimentation areas we are examining is financing for development which remains way below expectations especially in developing countries. Achieving the SDGs cannot be done without securing business financial flows. This is why governments and businesses together are increasingly exploring new ways of attracting impact investments that are capable of generating a wide range of development co-benefits by contributing to one or multiple SDGs. One promising way of doing so, is by scaling-up impact investments using blockchain. If properly used, Blockchain powered platforms can enable impact investing ventures to enhance trust, transparency and accountability while lowering costs and broadening the participation base for impact capital investors through effective disintermediation and decentralization. Impact tokens can be a game-changer in the impact investing marketplace. If their use cases are properly developed, impact tokens have the potential not only to accelerate financial flows for impact investments but also to capture multiple values. In fact, tokens can be used to attribute impact and derive financial value from it, they can also be used as quantified units of impacts for one or several SDGs and to bolster trust and transparency. Nevertheless, it is still too early for impact investing communities to use impact tokens at the scale needed to unlock critical financing for the SDGs.

Value Creation and Unethical Corporate Donations

Khelifa Mazouz

This study explores the effect of directors' political contributions on IPOs' valuation and subsequent performance. We find that individual contributions by directors bring significant benefits to the IPO firms. Specifically, we show that political contributions of board members, particularly those of CEOs and founders, increase the IPO premium and the long-term performance of the IPO firms. These findings do not depend on the directors' political ideology or party affiliations and are robust to endogeneity concerns and to alternative measures of political donations and IPO performance. As a possible consequence of Citizens United, we also find that individual contributions of IPOs directors have tripled, with a trajectory of further increase. Our results confirm the relevance of signaling and resource dependence theories.

SESSION III:

ISLAMIC PERSPECTIVE ON CIRCULAR ECONOMY AND SUSTAINABILITY

Islamic perspective on Circular Economy

Ali Al-Quradaghi

Man-made crises and disasters prove to be an opportunity from which mankind can benefit and take lesson to learn to be conscious of Allah's blessings and care for its rights. One of these lessons that we came to realize is that capitalism is naturally driven by selfish profit maximization actions. This 'oppression of freedom' and economic hegemony has led to environmental problems, which pose threats to humankind livelihood. In this light, the circular economy tends emerges to alleviate this oppression, preserve the rights of others, and protect the environment. Undoubtedly, the principles of circular economy coincide with Islamic economic theory. This paper endeavour to study Circular economy in relation to Islamic economy and its principles, in two chapters. The first chapter will be on "Defining Circular economy, concept, goals and benefits", and the second chapter will be discussing Circular economy in Quran, Sunna and Maqasid.

Islamic Perspective on Environment & Sustainable Development

Abdulazeem Abo Zaid, Mohammed Gammal

Islam safeguards and protects all aspects of human's life and guides Muslims with proper etiquette of dealing with their surroundings and environment. It also urges individuals to preserve the natural resources for their needs as well as well as the needs of future generations. With this regard, Islamic legislations does not limit these virtuous actions as recommended ruling, but these rulings vary between obligatory, prohibitionary, recommended, and reprehensible, which indicate Islam special care on the environment protection matter.

The research, therefore, reviews the shariah's perspective on environmental issues and attempt to relate them to Islamic jurisprudence rulings through induction methodology, especially those matters related to what is known today as "sustainable environment". This will show and prove the precedence of Islam in environment protection related matters, which has layed the foundations of today's sustainable development agenda. The study also adopts the Maqasid approach in addressing environmental issues, since the preservation of environment and its sustainability has been emphasized by Sharia, and negligence in return threatens environment sustainability or at least depletes its resources.

The Impact of Islamic Methodology of Sustainability and Circular Economy on Qatar National Vision 2030

Omer Mahgoub Mohamed El Hussien

This study aims to define the concept of circular economy and sustainability and explain Islamic value and ethical concepts with regards to prohibiting of waste and encouraging moderation as the vicegerent of this earth. The study illustrates the relationship between the aforementioned values and Circular economy, and shows that these values preceded the emergence of circular economy. The study also aims to examine the circular economy from the perspective of entrepreneurship and sustainability as well as the Qatar National Vision 2030 and analyze to which extend it relates to the concepts and values of Islam on sustainability and the principles of circular economy. The researcher adopted the descriptive analytical approach to link between the values of Islam and sustainability, considering that Islamic values are the major determinants of sustainability, circular economy and the driving force towards the preservation of the environment.

Sustainability and Profitability: Can Adherence to Ethical Codes Makes Decision Making Easier?

Salman Ali

Scholars had differed whether managers are primary responsible to shareholders or to other aspects such as the long-term prospects of the firm or to other stakeholders or even to the larger environment in which businesses operate including sustainable business practices. Notwithstanding recent voices and momentum in favor of the later, modern management theory and practice largely favored the former, i.e. profit maximization is viewed as the primary responsibility of managers. This often left managers with the dilemma to choose one at the expense over the other, as sustainable business practices often locked horn with profitability. In this paper, we explore whether adherence to certain ethical codes and values – say Islamic principles – helps managers to overcome such dilemma. Citing evidences from classical literature, we argue that from an Islamic perspective, profitability and sustainable practices go in tandem and hence abidance to such ethical practices and beliefs makes decision-making easier for managers.

A Multi-layer Analysis and Solution for Climate Crisis: From The Restructuring of Production to restructuring of Knowledge

Omar Javaid

Abstract

The globalized system of production and consumption has successfully created a highly unsustainable lifestyle for the global elite. Despite the red flags raised by environmentalists since many decades, the systems have not been able to adapt to prevent climate crisis. This paper attempts to explore the root cause behind this inability while using Hollingsworth framework of institutional analysis. In this paper the Hollingsworth framework allowed peeling off the layers of the system to reach its axiomatic foundations in at least 7 steps. The path taken to discover the root cause is then reversed by creating an alternative set of axioms where environmental sustainability is a prime ingredient. The alternative axioms which are inspired by the core message of Islam are then used to construct a substitute system of production and consumption. The paper argues that reconstructing our society on the template provided by Islamic – environmentally friendly – principles and paradigm is fundamentally necessary to prevent worsening of climate crisis, or perhaps even prevent it altogether depending on how quickly the Islamic alternative is adopted and how many people accepts its adoption.

Keywords: Globalization, Paradigms, Climate Crisis, One Dimensional Man, Division of Knowledge, *Israf, Tabzeer, Takasur, Meezan, Qana'at*

1 Introduction

Environmental scientists have warned that if carbon emissions are not cut by half by 2030, then the runaway climate could not be stopped no matter what measures are taken afterwards (IPCC, 2018). This implies that the planet only has around 10 years (counting from 2020) now to take some serious action to shift from fossil fuels to renewable sources of energy or redesign the system of production and consumption to reduce its energy consumption. The concept of circular economy is under discussion in this context since a while (WEF, 2014, 2018). However, despite all the noise, multiple global conferences of all the world leaders, humanity has been able to produce more greenhouse gases than ever. World indeed have shifted 7% of its energy production to renewable sources, but only to cover the gap created by the decommissioning of nuclear power projects. While energy production through fossil fuels keep thriving (IEA, 2018).

There is another dimension of the problem. The modern lifestyle in the so called developed or first world economies is so resource intensive, that it would require many more planets if everyone on the planet attempts to adopt it (Wackernagel, Kitzes, Moran, Goldfinger, & Thomas, 2006). There is not enough resources on the planet even if just all the Indian population, for example, becomes financially capable to copy an average American lifestyle (Thiel & Masters, 2014). It's not just the question of energy, every resource that is required to build a first world lifestyle, including al the metals particularly steel, plastic, all types of fabrics, wood, etcetera, are not present in sufficient quantities to satisfy ever growing wants or even artificial needs[1]. Realizing the resource scarcity problem, some movements like that of Minimalism (Meissner, 2019) or Zero Waste Lifestyle[2] are inspiring people to live with as lesser resources as possible, wasting as less as possible, and seeking joy in human connection instead of one's shallow affiliations with material stuff. However, speculatively speaking, the percentage of population getting inspired with such movements is perhaps far less than those who aspire to upgrade their lifestyles as per first world standards, and it will be unlikely that they will comprise of most of humanity, let alone top 10% of humanity in the next 10 years.

This paper is not being written to solve the climate crisis within a timeframe presented by climate scientists. The nature the problem tells us that that it is an impossibility to fix the climate crisis without changing the fundamental mindset (paradigm[3]) which created the crisis in the first place (Schumacher, 1973). If the prevailing paradigm does not allow visualization of a solution then the only way is to replace it with a new one. But if an entire civilization is standing in a certain paradigm then one cannot simply replace the paradigm with a new one, as subsequently the entire civilization would have to be deconstructed and reconstructed to fit into the new paradigm. Paradigms are also like templates, upon which the entire civilizations are built. So once a civilization has been established, it's an impossible to just replace it like it is impossible to replace foundations of a skyscraper without letting the skyscraper fall. So the author believes that only a miracle can save the contemporary civilization from an imminent climate apocalypse. Nevertheless the paper is being written with a hope that if it survives the

1 Air conditioning is an example which becomes inevitable due to our modern architecture which does not allow proper ventilation. Pre-modern architecture provides an interesting comparison in this context. See https://www.curbed.com/2017/5/9/15583550/air-conditioning-architecture-skyscraper-wright-lever-house

2 See http://zwia.org

3 Harari (2017) would use the term 'inter-subjective reality', it is a set of assumptions about how the world works and should work. It comprise of some sacred ideas, beliefs, values, meta-norms, which provides a group of people to make sense of the world in which they exists and organize themselves to ensure their collective survival. Harari believes it is uniquely a human ability to create inter-subjective realities as any other species does not possess the capacity. It may also be referred to as 'world view' or 'ideology'.

apocalypse, and if the survivors get their hands on to it, they would know how not to repeat the paradigm formulation mistake while laying the foundation of the new civilization[4].

This paper uses the framework proposed by Hollingsworth to analyze systems which is explained in section two below. The third section would use the Hollingsworth approach to peel off layers of the system to reach to its core, the paradigm. A top to bottom approach is taken in fourth section. The fourth section, would reconstruct an alternative system on an Islamic paradigm while using a bottom up approach. The last section would conclude.

2 Methodology

Hollingsworth (2000) framework provides a means to systemically evaluate institutions in the light of the broader systems and ideologies they are standing on. Hollingsworth (2000), Schumacher (1973), and many others (Asutay, 2007; de Soto, 2009; Greif, 1994; Mokyr, 2010) argue that systems are erected on their unique ideologies, paradigms, meta-norms, or set of axioms. It begins with development of a system of thought, followed by a system of communicating ideas, upon which human societies organize themselves on a macro and micro levels. This paper also uses Hollingsworth approach to analyze the modern system of production and consumption, the broader systems it is standing upon to the very bottom of its ideological construction. The comprehensive picture created as a result of this multi-layer excavation of institutional foundations, provides a critical medium to differentiate it with the alternatives prevailing in different civilizations (Hollingsworth, 2000). If there is no alternative to compare with, the approach can help see the very foundations upon which the system is standing, and if the anything in its foundations are changed, how it would subsequently change the system or its corresponding institutions.

The outcome of this approach is the exposition of the ideological or axiomatic foundation of a system or institution. The insight about the foundations of an institutions are essential at the time of adopting an institution from one civilization or society to another (Javaid, 2015a). If the foundations are diametrically opposed to each other, then the adoption is expected to do more harm than good, or at the best the results would be disappointing, if not in the short run, then definitely in the long run (Greif, 1994). Furthermore, the analysis also helps in identifying how deep the problem is. A procedural level or policy level problem in the system can be fixed

[4] This may found very dramatic, however, the more I study how the modern system if structured, the more I realize that it is beyond the capacity of the modern system to fix the problem which it is design to create by default. So people who survive are to be addressed so that they may not repeat the same mistake.

by changing the procedure or the policy. However, if the problem is in the ideological foundation of the institution, or the foundation of the system of which the institution is part of, or the foundation of the civilization of which the system is a part of, then fixing mere procedures or policies cannot solve that problem (Javaid, 2015a).

Effects of a problem with deep roots may disappear temporarily through symptomatic treatment, however the problems resurface, in other forms and cause harm to a different set of stakeholders (Beck & Ritter, 1992; Javaid, 2015a). Symptomatically addressing a problem is also important, however in the long run, if its roots are not addressed, the problem may aggravate. For that matter, Hollingsworth framework provides a handy tool, to trace the root of a problem and see how deep it goes, and subsequently what measures could be required to fix the problem permanently in the long run. Without such an analysis, certain deep rooted problems seldom get solved, while the problem solvers remains in an illusion of having solved a problem. And when the problem resurfaces after a while in a different form, often something or someone else gets the blame. Without undermining the significance of firefighting for quick fixes, it is argued here that to fix the problem at the root, analysis of the problems within institutions, systems or societies, Hollingsworth framework is to be used, so that long term measures are taken to fix the problems at the root, or while creating a new system old mistakes while laying down new foundations are not repeated.

3 Excavating The Advance Industrial Society

In this paper the author use the phrase ‘advance industrial society’ to refer to the way production and consumption is organized, nurtured and regulated in the modern free market society. Using the framework of Hollingsworth to analyze the system’s foundations, author was able to dig through multiple layers of the system of production and consumption as used in the advance industrial societies today to reach to the root of climate crisis. Following is a brief description of these layers:

1. The top layer visible to the ordinary person is a system of production and consumption operating on a global scale which is responsible for much of the environmentally destructive practices.
2. The system has been pushed[5] all over the world driven by an insatiable desire of a small elite to maximize profits.

[5] Referring to the famous quote by Karl Polanyi (1944) ‘Laissez-faire was planned, planning was not’

3. A part of the elite, the management hired by the elite also participates in the process, which calculates the profits maximized by employing certain accounting techniques and standards.
4. Accounting techniques and standards, consider exchange to be happening strictly in a monetary sense, while any non-monetary exchange which happens with stakeholders such a natural environment and society is never accounted for.
5. The multidimensionality of exchange process is also invisible because the exchange is considered as a linear process, not a circular one. It is not visible to the specialists in most fields that the outputs or externalities they create in any type of exchange process, can complete a full circle and affect them as well in the long run.
6. This invisibility to the circularity of exchange process is perhaps because of how knowledge is organized in the free market society and developed in compartmentalized-isolated-domains which typically miss to see the bigger picture, let alone circularity of the impact they create.
7. Finally, the compartmentalization of knowledge in micro specializations is a result of a peculiar meta-physics which defines the epistemology of knowledge and ontology of man in a very narrow and specific manner.

This section will elaborate each of these layers to explain the root of the problem on an axiomatic level.

3.1 Global system of production and consumption

Our contemporary supply chain is global, we route raw material and labor from every nook of the planet, and sell products at every corner. Priority of businesses, particularly Multi-National Corporations (MNCs) is to sell the product to as many global locations as possible. Search of labor, raw materials, product components and customers is typically done either to minimize the costs or maximize the profits (Bakan, 2004). An interesting case in point is the phenomenon of exporting a product to a buyer in another country for higher profits, while the local demand is met by importing the similar products from other countries. Pakistan, for example, export and import cotton at the same time[6]. The phenomenon is known as intra-industry trade (Taylor, 2014). Although the volume of intra-industry trade is not significant in comparison, however the phenomenon is referred to as economically beneficial, with an encouraging tone, in the

[6] See https://tradingeconomics.com/pakistan/imports/cotton, accessed on 29th July 2019

relevant literature (Melitz, 2003). Increased variety of products or product differentiation is typically referred as an advantage of intra-industry trade (Ruffin, 1999). The benefits are exclusively measured in purely economic terms, while the carbon foot print or other forms of environmental impact generated due to excess transportation (required to ship the products to consumers in a different country while importing the same products for the local consumer) is typically not the focus of concerned literature. Goal is to perpetually maximize profits (Bakan, 2004; Boltanski & Chiapello, 2007).

3.2 Hunger for Profit Maximization

Global system of production and consumption is better for profits than a local one. A global system gives unprecedented opportunity to maximize profits, while the locally organized system of production and consumption only limits the possibility of growth due to limited number of customers, less variety of labor or skills and limited amount of materials, subsequently limiting the growth of the locally organized enterprise. So it is the idea of perpetual growth which motivates the 'one dimensional man' (Marcuse, 1991) of advance industrial society to expand the system of production and consumption to every nook at corner of the planet to keep the growth engine running perpetually. The consumption and employment needs of the neighborhood are often ignored as production is conveniently shifted to countries which offer cheaper labor, low tax rates, lax environmental laws, little wage control, and where it is easier to bribe officials to look the other way (Jaffe & Quark, 2006). Products are shipped to places where the customers have a higher purchasing power (Sachs, 2010).

Often raw material is sourced from conflict zones, like in Africa, controlled by militant groups with track record of extreme human rights violations (Pouilly, 2007). Usage of slaves working to dig the minerals from mines brings the cost of extraction down significantly, subsequently lowering the selling price. For example, Coltan a mineral used in electronic circuits is mined in Congo in such conflict zones, and sold in the international markets for a lesser price (Ayres, 2012). Oil production in Nigeria is controlled by a corrupt regime supported by oil companies in other countries for the same reason (Cockcroft, 2012). Cockroft (2012) has identified MNCs as a one of the sources of corruption in many third world countries who bribe politicians to keep the wages low, evade taxes, loosen capital controls or look the other way when MNCs create environmental disasters to ensure their growth.

These are just a few examples, suggesting that while organizing the trade, lower costs and higher profits are perhaps the only criteria sought by the managers of corporations operating

on global levels irrespective of externalities on the outside world. A distance of thousands of miles also makes it easier a company or its managers to ignore the consequences of their decisions on the local population and vice versa (Besser & Jarnagin, 2010). Typically corporations do not mend their ways unless their practices are exposed in the main stream media. To save their face, they take some corrective measures and hire a PR agency to project an exaggerated image to the general public. However, if it's possible to get away with a destructive act, if there is no impact on the balance sheet or the income statement, corporations often do that anyway in the interest of shareholder's value (Bakan, 2004).

3.3 A faulty accounting system

The damage to the environment and communities is typically out of sight of modern business practices, unless it turns into a public relations crisis and have its toll on the brand equity or shareholder's value. So the damage has to impact the company's balance sheet negatively directly or indirectly (damage to the brand image) to get noticed (Bakan, 2004). It is out of question to include the cost of the damage to the environment, for example, to calculate company's profit, as environment itself does not come forward to make a claim for the damages. However the communities which are affected often come forward to protest when their survival is threatened due to some industrial activity, protests against Dakota access pipelines is a recent known example (Fredericks, Meaney, Pelosi, & Finn, 2018). The damage to the communities in the form of social disintegration is also largely subjective and difficult to be articulated in terms of monetary value, making it even more convenient for corporations to shy away from taking the responsibility (Jaffe & Quark, 2006). In other words risks posed by the damages are externalized by corporations so that someone else may handle it if necessary, so as to evade the cost of responsibility of the damage inflicted on the outside world (Lanier, 2014).

It is costly for a business to act responsibly which can have a negative impact on the income statement and subsequently on the shareholder's value, therefore, strategy of evasion or 'letting someone else deal with it' is often adopted, particularly when it's difficult to calculate the cost of an impact in pure monetary terms (Beck & Ritter, 1992). Often the damage is simply ignored, like in case of oil spills if there is no party claiming for damages in a court of law. It is even more convenient to evade if the damage is visible in the long term (greenhouse effect of burning fossil fuels or emergence of drug resistant bacteria due to overuse of antibiotics)

particularly when it is difficult to pin point which corporation actually contributed more towards the damage.

In advance industrial society, the risks externalized by one industry often become a capitalizing opportunity for another industry, which offers products and services to the effected populations, while creating new kinds of risks. Ulrich Beck (992) referred advance industrial society as Risk Society due to the peculiar behavior of continuously producing, externalizing and capitalizing on the new risks. A vicious circle is created which subsequently effects more and more people over time (Lanier, 2014). Externalization of risks, and reluctance to bear the cost of responsibility of minimizing them is also acknowledged as one of the fundamental contributors of inequality in advance industrial society (Beck & Ritter, 1992). This is also an epistemological problem, as the calculation of costs are exclusively done in quantitative terms, while any difficult to quantify cost is ignored also because of epistemological limitations.

3.4 One dimensional Concept of Exchange

The one dimensional, self-centric, rational and short-sighted approach of modern man (or a corporation which is also treated as an artificial legal person in a court of law in capitalist societies) blinds him[7] to consider the impact of his actions or the risks associated with it which appears to be non-economic, which does not affect him, which cannot be quantitatively expressed and will not appear in the short run. The one dimensional man, a term coined by Marcuse (1991), is the harbinger of the modern Risk Society. The concept of modern corporation is also built on the image of such a kind of a man, also referred to as homo-economicus (Bakan, 2004).

On the contrary, in traditional societies, we often find people who see themselves associated with others not just economically, but also socially and spiritually (Forbes, 2008). They are more collectivist and community oriented rather than self-centric. They often appreciate the subjective nature of reality, and have a long term perspective while evaluating the outcomes of individual or collective actions. For such a person exchange not just happens only in economic terms but also in a social and a spiritual sense. Such a person acknowledges the exchange of trust and security in purely social interactions. For example, when a person visits a sick relative, and express his care, a similar reciprocal behavior may occur in the opposite direction (Diamond, 2012). Likewise, taking care of the natural world is done with the same zeal, simply because the natural world provides for our sustenance (Forbes, 2008).

[7] 'Him' is used just for the sake of convenience; the argument is rather gender neutral.

For example, Forbes (2008) suggests that Aboriginal tribes do not consider themselves as dominating the natural world, rather consider themselves as part of the bigger reality of which natural world and human beings are an integral part of, both depending on each other, both linked with the other in a process of mutual exchange, only giving what is beneficial for the other to survive. What we exhales or excrete is inhaled or absorbed by the plants and what is exhaled or produced by the plants is inhaled or consumed by humans. The two way dependency implies that the natural world which provides us for sustenance must be taken care off, even if there is no immediate benefit.

Exchange with the natural world or the community we live in, therefore, can happen in a variety of ways where its quantitative evaluation is not possible, neither appropriate. Typically, traditional cultures in various societies have a criterion of subjective evaluation of the exchange with social and natural world, which is taught to new generation by the previous ones. Modern-one-dimensional-rational-self-interested-short-sighted-man, however, finds it difficult to appreciate the nature of such an exchange. The inability is not just epistemological (only quantitative evaluation accepted) but also an ontological one. One dimensional modern man typically considers himself as a dominant force to exploit the natural world for his advantage, while ignoring his reciprocal role of taking care of the natural world (Harari, 2017). It is a one way relation for him, which follows a straight line. Reality is perhaps the opposite.

3.5 Linearity of the Exchange process

It is hard for a one-dimensional-short-sighted-modern-man to see the circularity of the exchange process. 'What goes round comes around' literally happens in the natural world. However, the one dimensional modern man sees the transaction happening in a very linear fashion. Raw material is taken, transported, processed, distributed, sold, consumed, and discarded (Morgan, 2015). He typically do not see even the economic impact of his transaction beyond his immediate stakeholders, let alone see – what is given back to the nature at the very end of a supply chain – is acceptable to the nature or not. For the one-dimensional man the exchange with the natural world is not even an exchange after all, as there is no economic transaction happening, the epistemologically-biased-quantitative-focus on short term economic returns coupled with ontological bias against nature as inferior and exploitable, does not allow him to see the circular nature of the exchange which must prevail in the natural system. Nature in itself is a closed system; it consumes everything it produces, while nothing goes to waste. Modern one-dimensional man operating incompatibly with the natural world can only be

viewed as an anomaly from the point of view of the nature. If inside a human body, an organ begins to consume other organs, or excrete substances which cannot be consumed by other organs; it would be regarded as diseased. Such a diseased organ may be referred to as a cancer, whose urgent cure would be sought for; however, ironically, the one-dimensional man finds it difficult to view his exploitative and pollution creating practices as an anomaly (Forbes, 2008). As a result he (or she) has eventually created a world where his own survival is becoming difficult, depending on his ability to purchase a way out while transferring the risks to others (Beck & Ritter, 1992). The linear supply chains now starts from one country and ends in another, the journey from raw material to finished goods typically take thousands of miles. Often products contain substances, like plastic and other petrochemical compounds, which cannot be absorbed neither by the human body nor the natural world. Further, the waste produced at the end of consumption is often shipped to other countries for disposal or recycling (Baldé, Wang, & Kuehr, 2016). The process is anything but circular. The emission of greenhouse gases in this entire process particularly in the transportation system disqualifies the process to be referred as circular even if, hypothetically speaking, the waste at the end of the supply chain is 100% recycled, and the entire extraction, production and recycling process is powered through renewable sources (Gregson, Crang, Fuller, & Holmes, 2015; Hobson & Lynch, 2016). A circular economy therefore is conceivable when the supply chain is localized, not globalized. However, that would not make much sense to the one-dimensional profit-hungry modern-man (or corporation). He would rather prefer to go for a global system of production and consumption for the sake of maximizing profits, while externalizing all the risks to others, while evaluating the performance of the supply chain exclusively in economic terms, or at best in the light of the rubrics used within his area of specialization.

3.6 Division of knowledge

Modern world is operated by innumerable specialists specializing in countless domains. Entire corpse of knowledge is divided in among multitude of specializations. The idea of division of knowledge is rooted in an evolutionary paradigm, which suggests that like biological organisms' knowledge also evolves through the process of survival of the fittest, where every individual or group of individual has the capacity to generate new knowledge in response to new challenges or risks created by externalities[8] of solutions derived from earlier

[8] Pollution is the most known externality. Iatrogenics of modern medicines is another known example. The banking system siphoning wealth toward the rich is another example.

specializations (Raffaelli, 2003). If the new specializations beats the competition by attracting more customers in a particularly market segment then it would grow (Loasby, 2004). Commercialization of each specialized domain of knowledge creates an incentive for everyone to reap the benefit of the knowledge they are creating. The self-interested approach in a competitive environment with quantitative evaluation of results predominantly in monetary terms would restrict the one dimensional modern man to take a holistic view of the entire system. He looks only where his interests appears most vividly in the forms of numbers (Marcuse, 1991).

There is no ideal image where this collective evolution of all specializations would reach in the long run. No one can predict, as the new kinds of risks which would be produced in the long run through products or services to cater older risks are not known (Beck & Ritter, 1992). New specializations keep emerging reactively in response to new risks created in the system but in turns produce new kinds of risks. Bigger the risk, higher the commercialization potential of specialization which deals with that particular risk and higher the possibility of growth of knowledge within specializations with high commercialization potential. The bottom up approach therefore can go on for infinitum without hindrance, creating its own path. It is even impossible to tell, even unnecessary, how the whole system would look like as long as the individual members are able to grow materialistically (Loasby, 2004).

There is no big picture in this bottom up approach let alone anyone is trained to adapt to a broad ideal of a society[9]. There is only a picture of a perfect individual, referred to as Homo Deus by Harari (2017), while each individual is encouraged to achieve that ideal within himself, irrespective of how it impacts the world at large. The future of the modern civilization is therefore a cumulative outcome of innumerable self-centric, reactionary and irresponsible modern individuals striving for personal growth in pure material sense. The near future however can be predicted very well by the risks modern man has created so far for the world at large (Beck & Ritter, 1992).

The one dimensional self-interested specialist is rather concerned about the economic value which his own specialization generates for himself and for his customers. Hayek (1945, 1952) believed that the commercialization potential of any body of knowledge encourage people to work specifically in one area, gaining experience and contributing more toward the specialization. Since Descartes, the emblem of knowledge is modern man (Cottingham, 2000),

[9] Science fiction novels are an exception, but according to which we should have become an interstellar species, everyone should have flying cars by now while problem of climate change would not exist

and free interaction of many such individuals subsequently creates innumerable specializations of knowledge (Hayek, 1945). Hayek (1945, 1952) believed that free interaction between different specializations also leads to unrestricted growth of knowledge, while the free market system encourages or discourages a particular specialization automatically depending upon its commercialization potential. Specializations which are not in demand are left by people while those in demand are opted for, till the supply matches the demand, creating equilibrium (Raffaelli, 2003).

The modern, one-dimensional-specialist is formally qualified to focus only at his area of specialization, while he typically remains unconcerned about the other unrelated areas, areas on which his one dimensional economic interest is not connected to. It is difficult for him to see or evaluate the impact of his action other then what his specialization trains him to see or evaluate, particularly when the impact has a subjective nature. His sense of responsibility is also restricted by his area of specialization (Beck & Ritter, 1992). Every specialist operates in small interdependent silos, where output of one is an input to the other[10]. Yet no one understands the entire complexity of the system, the effect of each component on the other. Even those trained to take a macro view only focuses on a certain aspect, like an economist would only look at the data emerging from the markets, while ignoring the socio-emotional or environmental impact of an economic activity, particularly when the impact is difficult to quantify.

So eventually this one-dimensional, value maximizing specialist, focused on his own self-interest, while measuring his worth purely in quantitative terms, only see a small one dimensional arc of the circular process, an arc so small that it appears linear. His focus on economic self-interest encourages him to externalizes his risks, his specialization creates the perfect excuse of 'I am not a specialist of this area', so 'let someone else deals with it' (Bakan, 2004). The narrow-self-interested-linear-short-term focus of specialization allows him to neglect the possibility that his waste ought to be handled by someone else or his waste can become someone else's cost. And if that someone is the environment, or any entity which is easily exploitable, and if the cost of the damage which the waste creates or the benefit of cleanup is unquantifiable, than it is possible that the waste will be left unaccounted for (Bolt, Ruta, & Sarraf, 2005). Those who are responsible have their economic interests attached to the

[10] This even happens in big organizations; Tim O'Rielly (2017) has explained how different teams working inside organizations like Amazon, Facebook or Google are not aware of what others are doing, so eventually no single person in these organizations can actually understand how the entire system works. The same can be extrapolated for the entire modern economy operating on the idea of division of knowledge and labor.

process which creates environmental pollution (Klien, 2015). Many among the beneficiaries even resist any change which would reduce environmental destruction simply by refuting the data shown to by experts by labeling it as a conspiracy of their competitors in the market place[11].

Resistance to a body of knowledge which threatens the interests of a particular group may not necessarily come from the people in power. Mere bureaucratization of a certain specialization leads to resistance to any necessary but major change (Campagnolo & Vivel, 2012; Phelps, 2006). Emergence of multiple areas of specialization in a market society by self-interested individuals also created the need of bureaucratization of knowledge by corporations and state institutions. When a body of knowledge becomes valuable, it becomes an asset, whose protection cannot be just left on some concerned self-interested individuals operating independently. Bureaucratic system of management therefore is employed to regulate the dissemination, growth and protection of the knowledge emerging in a particular specialization. Bureaucratization also defines the boundary conditions to maintain the differentiation of one specialization with another, due to the economic interests involved, particularly of the ones who have invested in the growth of a specialization. State institutions also set regulatory standards to prevent any abuse or misuse of a body of knowledge. Protection through bureaucratization also prevents the rise of any competing body of knowledge, particularly when the state bureaucracies are involved in the protection of a particularly specialization. This becomes problematic particularly when risks associated with certain specialization surface and a competing specialization claim to address those risks. Bureaucratization therefore ends up resisting alternatives and uses its economic and political influence to subdue any competing specialization which threatens its obsolescence[12].

3.7 In retrospect

Free market society and ontology of individuals in a market society has been formulated on evolutionary lines subsequently creating a scenario where individuals or organized groups of individuals (corporations) compete with each other for higher profits (Boltanski & Chiapello, 2007; Raffaelli, 2003). The key arsenal of every competing individual or organization is a

[11] For example, Donald Trump (POTUS at the moment) and his associates in White House these days are a good example in this sense, they neither have the technical competence to understand the problem of climate crisis nor their interests are aligned with the act of understanding the problem

[12] Please see Marcuse (Marcuse, 1991), Hayek (1945, 1989), Beck and Ritter (Beck & Ritter, 1992), Javaid and Suri (2016), and Kuhn (2012) for details on how bureaucracies resist alternative knowledge structures.

valuable body of knowledge or specialization. They compete to get the lion's share of customers using the knowledge to offer better solution to the problems customer seeks to solve in a particular market segment. This pursuit of self-interest in micro areas of specialization only makes the world look linear. On the contrary, all natural systems including human systems are circular in a holistic sense, where consequences of an action can bounce back and affect the very actor in due time. If I pollute, pollution can harm me as well. However self-centric approach with a motivation for quick quantitative results only leads to accumulation of knowledge where one's contribution and benefit is seen on a very micro-scale, while circularity of the human system typically gets ignored.

Circularity becomes invisible when individuals thinks more about themselves then the bigger picture, while interaction with the stakeholders become only a one dimensional process of economic exchange due to quantitative evaluation of outcomes. Ontology of the modern self and its position in the order of things (cosmology) therefore makes the circularity of natural or human systems irrelevant, while epistemology of evaluation of outcomes (quantitative) obscures the multi-dimensionality (subjective evaluation of outcomes in a pure social and spiritual sense for example) of an exchange process. So the exchange becomes linear and one dimensional. For example, if a one dimensional modern man organizes a production system, its socio-emotional, spiritual and environmental implications are often ignored, let alone how they would impact him or his future generation.

His derive from short-term quantitative results, limited liability, restricted sense of responsibility, based on his focused specialization and a self-centric world view does not create the need to take into account the long term and subjective outcomes impacting the world outside the range of stakeholders engaged with him in a purely economic sense. His (or that or a corporation's) accounting practice, which provides vital information about his success of failure in the market only records what affects him in purely quantitative (economic) terms in a particular quarter or an year. After all he is not responsible to bear the cost of emitting greenhouse gases or destroying marine life to make a fortune for himself. So he produces more and more, for an ever growing customer base, using resources not restricted in a particular geographical region, as growing the length and breadth of his supply chain increases the returns. So from local he goes global, while his accountants keep feeding him data about how much wealth he (or the corporation's shareholders) has accumulated, yet none of his direct stakeholders tells him how damaging his influence on the environment and society has actually become.

3.7.1 The axiomatic foundations of the modern system of production and consumption

So in retrospect the problem of climate crisis can be traced back to three fundamental axiomatic ideas. These are:

- ***Ontology of self:*** Man (or women) is the being of the highest order, the primary source of knowledge, who is rational, competitive, short-sighted, whose goal is to exploit natural resources for his own self-interested ends, he takes responsibility of his action to the extent the outcomes influence him back in the short term.
- ***Ontology of the world:*** The world offers resources which the one dimensional modern man can exploit to create an alternative world the way he pleases, there is nothing sacrosanct which is to be preserved, so the future image of the world is not known, it would be rather shaped by the collective action of man, outcome of which cannot be predicted in the long run.
- ***Epistemology:*** Only that which can be quantitatively measured can be known, let alone exist, the whole cannot be measured, only the bits can be measured, so the knowledge that is acquired through measurements is only of the bit, but not of the whole. Like the content each bit of knowledge, its value is also quantitatively measured, which is best done in monetary terms. The monetary value of anything in the market is in flux therefore value of knowledge of anything is also in flux, and once the value drops, new knowledge of higher value must be acquired. Making a certain body of knowledge sacred and holding on to it can threaten one's survival if the economic value of that body of knowledge drops in the market. Therefore, knowledge of lower economic value must be replaced with knowledge of higher economic value to ensure survival in the market place. Knowledge therefore is in constant flux, and is valued if its value is quantifiable.

4 The Alternative

To address the problem at its very root, three axioms stated above need a makeover. Turning them upside down would perhaps provide us a foundation to erect an alternative system of production and consumption which would appreciate the sanctity of the natural world around us while avoid problems like climate change. The alternative axioms can be:

- ***Ontology of self:*** Man (or a woman) is an integral part of the natural systems, who is first and foremost a spiritual, socio-emotional being also capable of rationalization. He can be farsighted. His inner satisfaction depends on living in harmony with the natural world while fulfilling his needs. He can feel unconditional concern and responsibility for any being,

particularly human, or object in the world around him even if the being or object is not associated with him directly. The purpose of man therefore is not just to survive, but to seek meaning in transcending beyond his existence, while nourishing all lives around him in the process. It is the very ability to transcend is what differentiate him from other sentinel beings, the absence of transcendence from one's life would equate to death of his humanness, and therefore of his kind.

- ***Ontology of the world:*** The natural world harbors and nurtures life, therefore, taking care of the world becomes a fundamental responsibility of its inhabitants whose life is being supported by the world. If life is sacred, then the natural systems which support life in the world around us are also sacrosanct. The core of the natural system which supports all life, including that of the man, must be preserved, so that all lives of all beings which are dependent on the natural system are also preserved.
- ***Epistemology:*** Knowledge is a-priori to human existence, it emerges from the natural world, it is revealed by Prophets, it may be based on the experience of our elders, it is not confined to our five senses, rather intuition and spiritual experience can often reveal necessary details about the world around us, the worth of knowledge cannot be measured, therefore it cannot be traded, it belongs to the commons, a resources available for all to use, which is multiplied with use. To enable more people to use it more, it must be spread unconditionally. Since the natural world is sacred, all life is sacred, therefore, knowledge which helps in the survival of the natural world and all its constituents must also be sacred. Emerging challenges to survival of natural world and all its constituents including human being, eventually lead to emergences of new knowledge which can help ensure the survival of all, however the fundamental qualifying criteria for emerging knowledge would be in its ability to facilitate the survival of all beings and achieve transcendence.

Keeping the three alternative axioms in view, if we retrace our steps from the structure of knowledge to the design of our production system, the path would take a different route with unique end results. To begin with, the alternative structure of knowledge that would emerge from the stated axioms, would enable mankind to transcend beyond their selves, while, making sense of the emotional and spiritual experience which emerge in the process of preservation of the world beyond our own existence. Both Carl Jung (2006) and Victor Frankl (1997) acknowledged the significance of religious knowledge which provides us a meaning to our complete existence (including spiritual and emotional aspects of our being) along with a framework to transcend our being beyond our self. Any piece of data, information or idea may

only be referred to as Knowledge if it enables us in achieving the purpose of our ontological self. Axiomatically, any bit of data, information or idea which allows us to survive in pure material sense, but not facilitate in the achievement of purpose, may be considered useful only if does not contradicts with the purpose of self. Such a bit of information however may not be referred to as knowledge. Knowledge would be referred to as something which enables our spiritual transcendence and give meaning to our actions to benefit others; knowledge is simply that which helps a man (or a womnn) to achieve the purpose of the ontological self[13].

4.1 An alternative structure of knowledge

Islam in this sense provides a much suitable and comprehensive guide to transcend beyond our material self while fully engaging our spiritual and emotional faculties in the process. This claim is made due to the breadth and depth of subjects covered in Quran and the examples which Prophet Muhammad s.a.w set in every facets of his life. Prophet Essa a.s for example never married, never fought a war, therefore his example provides a lesser degree of guidance in comparison. Buddha also lived a very limited rather monastic life, so despite of many of his worthy teachings, he also cannot be looked upon as a guide for multitudes of challenges a common man faces in his everyday life. So the teachings of Prophet s.a.w and the Holy Quran can be referred to as more thorough in comparison. The differentiation other than comprehensiveness is the unifying theme which synergistically connects teachings of Islam pertaining to all aspects of our private and collective lives in a way that our act in every role converges toward achieving the purpose of our creation. The structure of knowledge as presented in the Quran, can therefore, become the structure for Muslims to synergistically organize their knowledge pertaining to different aspects of their lives. Religious texts, like Ahya-ul-uloom by Imam Ghazali (for example) may also provide us a structure (which is perhaps also derived from the subjects covered in Quran and Sunnah) for that purpose.

4.2 The circularity of exchange in Islam's paradigm

The message of Islam connects every aspect of our private and collective lives into a common theme in a way that every action complements the other. For example, the purpose of our business activity is also to fulfill our commitments towards our families, while the emphasis of keeping strong ties with the family often leads to emergence of a family oriented business

[13] This abstraction of the concept of knowledge is consistent with the definition taken in the section 3.6 where knowledge enables a person to grow in the market place, make more money, which is the purpose of the ontological self in the modern paradigm.

organization, as is witnessed throughout Islamic history (Javaid, 2015b). A number of studies on family businesses, even in non-Muslim societies, have shown how family members who share the profit can turn out to be better than paid employees due to their trustworthiness and commitment during difficult times (Arregle et al., 2015; Colli & Rose, 2007; Danes, Stafford, Haynes, & Amarapurkar, 2009; Hoffman, Hoelscher, & Sorenson, 2006; Tata & Prasad, 2015). Islam's instruction to write all contracts in presence of two witnesses and the belief that economic benefit or *rizq* is from Allah s.w.t, for example, prevents various conflicts from happening between stakeholders in business, whether family members or outsiders. A conflict free environment thus keeps one's heart clean from negative emotions which subsequently contributes towards the spiritual growth of a person. Spiritual growth in turn, leads to a better management of our emotions and reinforces a sense of meaningfulness in every aspect of our lives, which can also keep us mentally healthy (Frankl, 1997). This is just a small glimpse of how Islam can connect every aspect of our lives into a single whole.

This synergizing of the multiple facets of our lives is one of the important differentiations of Islam with other belief systems making Islam free it contradictions. In comparison, the modern way of life, specifically in a free market society, the one-dimensional man often fails to connect different aspects of his life leading to contradictions. While prospering in one aspect, the modern man neglects others, particularly where his focus do not result in an economic benefit. The famous work-life imbalance in modern societies is an example.

The movement of modernism was driven by three ideals, namely: Freedom, Equality and Progress. In pursuit of freedom (via free market capitalism), equality is compromised, while in pursuit of equality (socialism), freedom is compromised, yet in pursuit of progress, the health of the natural world has been significantly compromised. The cause of these contradictions lies in evolution of innumerable domains of knowledge or specializations, which interacts with only a few other specializations while remaining disconnected with the majority. Such a compartmentalized evolution of knowledge can only be expected to create contradictions which have become an inherent part of a modern life style. Each contradiction creates new challenges and risks for others to solve, which are solved only if there is an expected return on investment. So far saving the natural world from pollution has not made a significant business sense so far, therefore, the progress to fix climate crisis is moving with a snail pace, while the time is rapidly running out.

Islam's synergizing nature can train its followers, even non-followers, that how everything is connected and a part of a single whole. Disturbing one aspect of our lives can negatively affect other aspects. The idea of circularity, which was discussed earlier, already exists in Islam's

core philosophy. In Islam's worldview man is a vicegerent of God, a God who take cares of and justly treats everyone. If man, in his capacity as a steward toward other creations, would honor the role given to him by the God, he will be rewarded by the system created by God. Quran says:

> "And whatsoever good thing ye spend (in God's name), it is for yourselves (i.e. for your own good), when you spend it purely in search of Allah's pleasure; and whatsoever good thing ye spend, it will be repaid to you - in full and ye will not be wronged." (2:272)

The idea of circularity is unmistakably present in the above verse. What goes round does comes around, as Allah s.w.t does brings it come around. You do good, good will happen to you, you do a wrong, and you will be punished accordingly. This reciprocity is inherent in the core message of the Quran[14].

4.3 Multidimensionality of the concept of exchange

Allah s.w.t often uses the metaphor of trade in Quran to explain the exchange which a believing Muslim does with Allah s.w.t when he obeys the Divine message. He is however not paid in monetary terms; neither there is strictly a quantitative measurement of the reward. Often the description is subjective in nature. The reward may be in the form of mental peace (8:11), enhanced barakah in the rizq (22:58), or qualification for Jannah on the Day of Judgment (43:70; 18:107). Exchange therefore has a socio-emotional and spiritual dimension as well. Even if a Muslim trader performs an honest exchange in the market place, his returns are not just in the form of monetary profits, but also in the form of spiritual satisfaction particularly when he bears a monetary loss while abiding to the teaching of Islam (Al-Ghazali, 2007). Maintaining trust between buyers and sellers while avoiding any possibility of a conflict due to dishonest practices is a social goal sought by the teachings of Islam (Javaid, 2015b). Islam also teaches to value social relations, for example, while emphasizing on the rights of neighbors. A hadith[15] clearly instructs to prefer selling a product to one's neighbor in need of the product despite a stranger offering a better price. The emphasis clearly is to make exchange a means to maintain or strengthen social ties with the neighbors. Therefore a process of exchange even in a market place is not just purely economic, but also possesses a spiritual and social dimension in the Islamic world view, where benefits or losses are unquantifiable.

[14] Quran 16:97; 34:39; 24:77; 99:7

[15] Sahih Bukhari, Volume 1, Book 2, Number 12; source: https://www.sahih-bukhari.com/Pages/Bukhari_1_02.php; accessed on 24th Sep 2017

The multidimensionality of the exchange in Islamic worldview therefore implies that every action of a Muslim which impacts others is an act of exchanging one's deeds with reward or punishment on the Day of Judgment. There may also be emotional, spiritual and social benefits to be reaped in the material world. Where for the one dimensional modern man, the benefit is purely economic in nature, which may also generate some emotions of excitement or pleasure but nothing beyond that.

The multidimensionality of exchange in Islam's paradigm can have implications for a Muslim interacting with the natural world. A Muslim cannot escape the act of destroying the natural world like the modern man can in his paradigm; A Muslim will be punished for disturbing the balance in the natural world which Quran has strictly forbidden (Surah Rahman verse 7-9). The act of disturbing the natural order particularly becomes graver if it harms human beings who may be dependent on the natural order. The case of Dakota access pipelines would have been decided in favor of the native tribes whose water resources where threatened in the act of installing the pipeline in the light of Islam's teachings. However, protecting the interest of the capitalist to keep the country's GDP growing is perhaps more important in the modern paradigm.

4.4 A dual accounting system

The idea of recording the transactions is much older than Islam itself. Islam also puts a great emphasis on writing down the contracts. However for a Muslim the accounting happens at two places because of multidimensional nature of the exchange process in Islamic paradigm. The monetary values of debit and credit are to be recorded on paper. However, the counting of good deeds which every Muslim reaps while obeying the Divine commandments happens inside a Muslim's head. Islamic worldview trains every Muslim to keep in mind how much good deeds he would be carrying with him on the Day of Judgment in case if he dies at the moment. Quran tells a Muslim that his salvation on the Day of Judgment would depend not how much material wealth he has accumulated in the material world, rather how much good deeds the angles on his shoulders have recorded. The two angles referred to as *Kiraman Katebeen* (Surah Noah verse 11) are like two accountants, one of them recording the good deeds, while the other records the bad ones. Since we cannot see the angles, the idea that someone else is recording the deeds subsequently push a believing Muslim to keep a track of his actions himself, and keep seeking forgiveness. As success or failure in hereafter would eventually depend on the weight of one of the ledgers.

Since success in the eternal life in the hereafter is far more important than the temporary benefit of the material world, therefore, keeping his mind focused on good deeds is fundamentally more important than making sure that how much profit he is earning on a given day or quarter. Mental accounting of good deeds therefore is to be a stronger motivator for a Muslim mind, instead of his monetary concerns which he has recorded on a piece of paper. A Muslim trader therefore would worry about the social and environmental impact of his business practices, as the return he is expected to get is not just monetary in nature. A one dimensional modern man may also worry about his social standing in the market, however, his social standing is perhaps only a means toward his economic gains. Social capital is a term used in this context in relevant literature, where social relations are referred to as 'capital' because they are considered a means toward economic ends. For a Muslim the ends are not primarily economic, rather they are oriented toward his standing on the Day of Judgment, while for the economic gains, he relays on his Creator's promise to provide sustenance till his last breath.

4.5 The urge to maximize rewards on the Day of Judgment

A higher focus on the mental accounting of good or bad deeds would make a Muslim less competitive or self-centric and more concerned about other's wellbeing, as taking care of the all types of stakeholders would fill in the good deed ledger more. So unlike the one dimensional modern man, a Muslim's ultimate goal cannot be to maximize material wealth while competing with others. Surah Takasur in the Holy Quran, also specifically warns against competitive pursuit of material wealth, as such an indulgence may distract a Muslim from the performing good deeds, and may lead him into the hellfire on the Day of Judgment. On the other hand, Islam also discourage monasticism. Muslims are encouraged to pray for a material life free of misery also in the Holy Quran.

> "Our Lord, give us in this world [that which is] good and in the Hereafter [that which is] good and protect us from the punishment of the Fire." (2:201)

So a balanced approach has to be taken while ensuring as a Muslim is carrying enough records in his good deed ledger to become successful on the Day of Judgment. Often miseries in the material world makes it challenging for a Muslim to keep his spiritual orientation intact. Prophet s.a.w once said that poverty can also leads to apostasy[16]. This is perhaps because of the hopelessness which a poor person can fell into relative to a person who is not poor. In this

[16] Sunan an-Nasa'i 50:29

context, material wellbeing is to be seen only as a means toward success on the Day of Judgment.

Material wellbeing is also a means to live a life of service to others in an Islamic paradigm, which is difficult for a poor person. A Muslim in all his roles is supposed to take care of every stakeholder to the extent possible. It is an impossibility that an ideal Muslim would even think of exploiting a person or a natural resource for his advantage while leaving them worse off. Any practice which can be socio-emotionally, economically, environmentally (or in any other sense) damaging for others, is out of question simply because it will reduce the likelihood of a Muslim to find success on the Day of Judgment. The design of life support systems, which include the system of production and consumption, therefore must conform to the criteria of ensuring wellbeing of all stakeholders.

4.6 The design of the system of production and consumption

Islamic paradigm, as discussed above, can lead to the creation of a responsible system of production and consumption. The system would be concerned about the wellbeing of the customers, employees, the local environment and all other stakeholder. The circle of concern extends from the closest to the furthest. A Muslim is concerned first about his family, then his relatives, neighborhood, community, society, Muslim world and finally the entire world including all sentinel beings. Therefore, the system of production and consumption would take care of needs of stakeholders from the closest to the furthest. History of Islamic bazaars provides a clear picture of the system where a family based guild is involved in the manufacturing and sale of items for the customers in the neighborhood and the community. The employees in the guild are mostly family members or relatives, while the suppliers are also of local origin. In case if the raw material is not available in the close proximity it is then sourced from distant places. It may be argued that due to lack of rail road technology and heavy transportation like in the modern times, commodities never went too far. This is contrary to the available evidence as there were merchants who would want to export items to faraway places, while bringing in stuff from distant lands. However such merchants were not typically seen as likable by the local craftsman and traders (Yi, 2004). Production was typically localized, while limited availability of resources in the local natural world, often forced locals to avoid waste, and put all available materials to best possible use (Yi, 2004).

Islam's paradigm, if used as a master template, can be used to design a localized circular economy, where the needs of every individual are taken care off while wellbeing of the natural

world is also ensured. In Islam's paradigm the subjective cost (outcomes on the Day of Judgment) of unjust exploitation of any resource is simply unaffordable for a Muslim. Wastage of any resource is also a sin (Quran 17:27), so minimum most quantity of resources are to be used while producing the desired products, while making sure waste, if any, is recycled.

There is also an emphasis of preferring local customers over the distant ones. In this context, the emergence of a globalized system of production and consumption would not fit well within the Islamic paradigm. There would be a case of exporting the surplus after all the local demands are fulfilled. The surplus would however be exported, if the means permit, to places where the products are needed the most, as compare to places where the sale would yield the most amount of profits within the Muslim world, and then the world beyond. The returns on the Day of Judgment are far more important than worldly profits. Use of non-renewable resources would be discouraged to the extent possible, while renewables, recyclables, biodegradables will be preferred. The organization of a localized supply chain would also cut emissions from the transportation of products to distant places, which at the moment comprise of around 7% of total annual emissions in the world[17]. Finally it is also possible to see the socio-emotional and environmental impact of one's business decisions more directly if the all the stakeholders (customers, employees, suppliers etc.) are local then global, which in case of global supply chain becomes more obscure.

The ideal consumer in an Islamic society would also be inspired from the humble traditions of Prophet s.a.w and his companions r.a. Quran also clearly instructs to keep away from the life of extravagance (*tabzeer*) and discourage from spending beyond means (*israf*). A culture of conspicuous consumption therefore is unthinkable in such a social order were *takasur* is specifically discouraged in the holy Quran. If Muslims pay heed to this advice, a race to maximize consumptions as encouraged by modern free market system would perhaps not exist in the Muslim world.

Table 1: Table one shows a comparison between the two systems built on two unique paradigms

Layer 1	Global system of Production and Consumption	Localized system of Production and Consumption

[17] See https://www.itf-oecd.org/sites/default/files/docs/cop-pdf-06.pdf

Layer 2	Maximization of profits which encourages going global	Maximization of rewards on the Day of Judgment by serving the local stakeholders
Layer 3	Accounting of loss or profits purely in quantitative monetary term	Accounting of rewards and sins through subjective evaluation of deeds, while ensuring financial sustainability of the business
Layer 4 & 5	A linear one dimensional idea of exchange which obscure the losses which cannot be calculated easily or whose affect will not be felt in the short run	A circular and multi-dimensional idea of exchange, as even words, acts of kindness, etc. can result in a return in a variety of ways as promised by Allah s.w.t
Layer 5	Compartmentalization of knowledge in specializations which are seldom connects, but compete more often, does not allow a general development of a holistic understanding of all aspects of life and the natural world	A unifying source of knowledge which synergize all aspects of life into a single whole while creating an interdependent relationship between every role a person plays in his life.

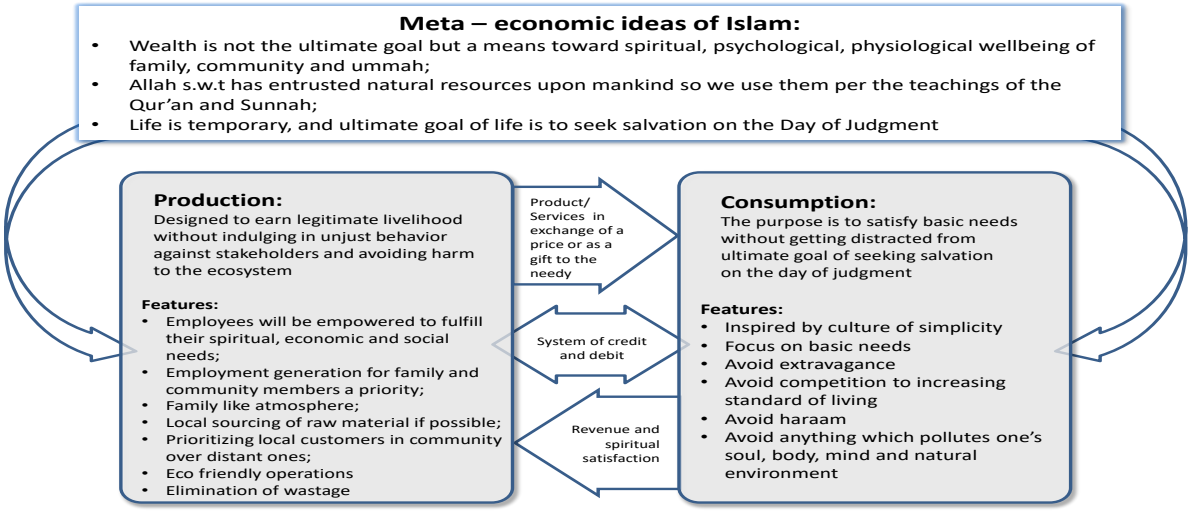


Figure 1: Islamic system of production and consumption, illustration has been taken from Javaid (2019)

The modern trends of Minimalism or Zero Waste lifestyle would be perhaps naturally compatible with the culture of a Muslim society, in fact keeping the consumption standards to bare minimum to save the environment would also find spiritual motivation as well in Islam's paradigm. To harm the natural world for the sake for unnecessary pleasures (tabzeer) would be a greater sin than extravagance which is harmless to the environment. An ideal Muslim consumer would therefore prefer a local circular economy in comparison for a global one, if all his needs are met locally.

Figure 1 is from a paper published by the author. In the illustration in Figure 1 Islam's paradigm has been referred to as Meta-economic ideas. This paper provides a more thorough description of the Islamic paradigm, articulated in context of one's impact on the climate change. Table 1 briefly compares the layers of the two systems.

5 Conclusion

This paper used Hollingsworth framework to excavate the roots of the modern system at it's axiomatic foundations to analyze the depths the root cause of contemporary climate crisis. The analysis revealed how the ontological and epistemological disposition of the advance industrial society creates a system where risks are externalized for others to manage. Often the multidimensionality and circularity of these risks are obscured due to the reasons explained in section 3, so it is unlikely for the system to acknowledge let alone effectively improvise to eliminate them. In modern paradigm responsibility of every individual or a corporation has an epistemological limitation which is often legally acknowledged as well. Externalization of risks, particularly when its economic value is difficult to ascertain, is also legal and considered as a standard practice particularly in the market place. Generally speaking, inability to assume responsibility of the risks produced for society and the natural world is a typical behavior of one dimensional modern man or a corporation. This behavior is grounded in the ontological and epistemological disposition of the advance industrial society.

On the contrary Islam's ontological and epistemological position does the very opposite, as every person is deemed responsible for the impact he or she creates in the world around them. Islam's paradigm acknowledges the multidimensionality and circularity of risks produced as a result of every action. Islam's paradigm also encourages every individual to assume responsibility of the consequences of every interaction he or she makes with every stakeholder in the system, even if the interaction in non-economic in nature. A system of production and consumption grounded in Islam's paradigm therefore pose a better hope to mitigate climate

crisis as compare to its modern counterpart. The crisis cannot be solved by the type of thinking responsible for the crisis in itself (adapting Einstein's quote), therefore a thinking, a paradigm, which assumes responsibility of one's action on all stakeholder, who are connected with each other in a multidimensional circular relationship, is perhaps the only hope for the humanity.

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SESSION IV:

CONVERGENCE OF ISLAMIC FINANCE AND CIRCULAR ECONOMY

Educational Designs, Innovation and Circular Economy in the Muslim World

M Evren Tok

This study will share educational designs related to embedding circular economy concept in learning, teaching and research. The study will highlight experiences of College of Islamic Studies in promoting maker movement which has yielded various innovative experiences of ideation and business modeling. The experience of CIS illustrates the important of interdisciplinary nature of designing educational models that cater to the needs of the Muslim World. While traditional models of circular economy are rooted strongly on technical features, embedding faith and moral values offers new perspectives.

Transparency and Investment Recommendations for Islamic Investment Accounts: An Empirical Analysis

Ahmed M. Badreldin

The UN's Sustainable Development Goals (SDGs) require sustainable investments in non-standard projects; however, sustainable investments are impossible without sustainable financing. Banks, as the core providers of bulk financing, face problems in ensuring sustainable financing; however, these problems are more pronounced in the case of Islamic banks since Shariah prohibits offering riskless interest returns on deposits. As a result, Islamic banks are prone to withdrawal risk, which they mitigate by smoothing returns of Islamic investment accounts, which in turn generates displaced commercial risk among other problems. In this paper, we suggest solving this problem by applying a new valuation benchmark that takes into consideration market segmentation. We then translate correct valuation into a practically implementable transparency scheme suitable for private and institutional investors. Using quarterly data from 81 Islamic banks in 16 countries across 8 years, we show how investment recommendations can be derived, which can then be transparently communicated to guide depositor behavior and provide regulators with an early-warning system for expected erratic withdrawals. This will enhance sustainable financing for Islamic banks, which in turn would allow them to engage in sustainable long-term investments, such as those required to meet the SDGs.Bringing

Islamic Finance Home Through The Circular Economy - Social Finance Discourse

Mohamed Aslam Haneef

Abstract

This paper argues that the current Circular Economy and Social Finance (CESF) discourse allows discerning Islamic economists to re-iterate the view that Islamic Finance (IF) must be re-aligned to its roots, i.e. Islamic economics. Notwithstanding the impressive growth figures of Islamic Banking/Finance over the last three decades, serious reservations are voiced especially on the role and impact of IF in Muslim communities. This paper critically discusses, albeit briefly, selected tensions that have evolved over the decades. The issues have moved away from merely those focusing on contracts/instruments or the debt/equity debate of the 1980s and early 1990s to a substantive systemic focus on the role of IF in developing the real economy to enhance the welfare of society as a whole. The paper then presents briefly the CESF discourse and argues that it provides another opportunity to re-align the current direction taken by Islamic Banking/Finance. The goals of IBF must be re-aligned to the overall socio-economic goals of society. Failure to do so will limit IBF to serving outdated neoclassical economics objectives of maximizing individual shareholder welfare that does not cater for overall equity considerations in society. The paper argues that since Islamic banking (IB) still dominates the IF space, whatever direction taken by Islamic Banks, by banking authorities and by IF educators will have a significant impact on meeting the challenges faced in the global system. The paper also argues that the CESF discourse provides a golden opportunity to re-visit the theory of decision-making in economics. All decisions must include a concern for others, including its environmental impact. The paper generally uses secondary data and discourse/content analysis involving literature written over the last 3 decades.

Keywords: circular economy, social finance, tensions in Islamic banking, genuine Islamization, re-alignment

1. Introduction

The Islamic Banking/Islamic Finance (IB/IF) journey has made progress over the last 40 years. A lot of ground has been covered, and yet, there is a feeling that we are not really

reaching our destination. I am in no way suggesting that contemporary IB/IF has failed. Let it be clear: contemporary IB/IF has contributed to Muslim societies, progress has been made and lessons can be discerned. However, there are 'tensions' in contemporary IF, especially seen in the literature of IB, both in theory and practice. There is still much more that can be achieved and the role and contribution of IB/IF to the general well-being of the way forward for IB/IF is to re-align itself with its Islamic economic (IE) foundations that were presented in the late 1960s and 1970s, but that got slowly marginalized with the advent of commercial IB in the mid- 1980s. With increased financial crises and environmental/climate change issues, there has been a renewed realization that our current economic paradigm is not sustainable. The circular economy and social finance discourse allows us a valuable opportunity to re-visit the understanding and role of Islamic finance to overall human well-being. This will bring about the realization of the visionary ideals put forward by pioneer contemporary Islamic economists in the 1970s, hence, bringing Islamic banking and finance 'home' to where it belongs.

2. Current Islamic Banking (IB)

According to the Global Islamic Economy Report 2018/19, Islamic financial assets stand at approximately USD2.44 trillion at the end of 2017, of which about USD1.72 trillion is in the banking sector. This means that other sub- sectors of finance are yet to challenge the dominance of banks in the IF space. This is quite different in the conventional scene, where banks face stiff pressures from other sub-areas of finance with the rise of the financialization process. Islamic banks still can avoid the pitfalls of financialization if proper steps are taken. Hence, many of the arguments made for IF, can actually still refer to the example of IB. However, IB faces challenges of its own.

In general, the practice of Islamic banks is to emulate and replicate the operations of their conventional counterparts or mother companies, albeit with modifications done to contracts used so that they are 'shari'ah compliant' (read Islamic law compliant). Simplistic as it may seem, this is the present general strategy of development adopted by contemporary IB. Despite the impressive quantitative growth of contemporary IB since its inception, there have always been views that are critical of the *qualitative direction* taken by the IB industry. A recent thesis by Amin (2018) argues that the entire conventional banking system is being replicated by the Islamic banking system. From debates about the purpose of IBs and the types of instruments used (in the 1980s till the mid-1990s), more recent debates have centred on

whether operating at a minimum legal standard actually contributes to the genuine improvement of society as a whole. For example, Haniffa and Hudaib (2007) find that ethical values in IBs are considered personal, often under-communicated and likely to be undervalued, while another study finds that issues of CSR are not of major importance in most Islamic banks (Hassan and Syafri Harahap, 2010). Finally, Asutay's (2012) critical analysis of IB development leads him to label the sector as a social failure that can only be supplemented by developing non-banking forms of Islamic finance.

Put another way, rather than focusing merely on the welfare of shareholders, the debate asks IB to broaden their purview to include all stakeholders. This seems to have had some positive impact on the development of IB. While still dominated by *mainstream commercial* banking practices, the last 10-15 years has seen efforts to establish *other types of Islamic banks*, modelled after what are called social banks that are part of social banking/finance. The last few years has also witnessed increasing discussion of the role of IBF in helping attain the United Nations' SDGs. Positive steps have also been taken to move away from just focusing on banks to *non-bank alternatives*. In addition, the numerous crises originating usually in the financial sector over the last 20 years has provided a new opportunity to re-look at the approach taken. In recent times, the circular economy discourse also provides another platform to re-consider the role of IB.

3. Selected Tensions in Contemporary Islamic Banking[18]

Notwithstanding the development and progress made in contemporary IB over the last 40 years, there has also been criticism targeting both the conceptual and practical levels of IB. This section presents some of these tensions.

a. Islamicity, Ideals and Realities: 1980s vs 2010s

A central nagging tension that has plagued contemporary IB and annoyed its many practitioners since its formation, is the doubt concerning the 'islamicity' or authenticity of Islamic banks. In the 1980s, the discourse

seemed to focus primarily on the practice of IB. The main criticism was that the practice tended to replicate conventional products, albeit with shari'ah (read legal) modifications. Critics saw the replications as merely legitimizing/ justifying the general framework of the

[18] Some of the issues are taken from Haneef (2009).

current banking system. However, even within the academia, there was, and is, great debate about the direction of IB and the preferences of instruments being used. In the early 1970s, when Islamic economists started writing about Islamic economics, IB was one area specifically addressed. The writings as a whole had put forward a very different IB than what IB developed from the 1980s to mid-1990s.

Initially, IB was proposed as part of an Islamic economic system that had a more 'developmental' approach and goal; an institution that not only focused on financial profits but also on socio-economic goals of the society. Hence pioneers of Islamic economics put forward equity and participatory modes of financing such as profit and loss sharing as the ideal form of IB practice. This would have required significant *structural change* to the institutions rather than just maintaining banks as we know them. However, the practice of Islamic banks and the realities of the replication approach saw preference for debt-based instruments and modes of financing. Trying to push existing Islamic banks to adopt equity modes of financing and to adopt developmental goals of society went against the existing models of conventional commercial banks.

The current discourse on circular economy and social finance (CESF) allows us to re-visit this issue. No more should the goal of the bank be just to maximize profits or shareholders' wealth. Shareholders are one stakeholder of the bank. However, the society at large, the next generation as well as nature are all stakeholders in the economic decision-making process of the bank. Discussions on CSR of banks have also opened up the space of discourse to re-look at the 'dominant IB as a mere *tijari* institution'. Today, the CESF discourse has broken down this paradigm put forward in the 1980s and religiously guarded by the IBF leaders and practitioners. Hence, even in Malaysia- the leader in the 'old school', has now put forward its new vision of 'Value Based Intermediation' or VBI that calls for 'looking beyond profit of the bank'. No one wants the 'practitioner-academic tension' that was so prominent in the 1980s and 1990s. The CESF discourse allows for much more interaction and agreement on the more holistic view of IBF in society.

b. Modifying Instruments or Fundamental Foundational Changes?:

As stated above, one major criticism of IB has been that it is modelled after the interest-based (especially commercial) banking system. Hence, the role and function of banks have primarily been retained while focus has been on creating *sharīʿah (read legal)* compliant

instruments. Academic critics[19] see much of what is practiced by Islamic banks as more expensive duplicates of conventional interest-based banking instruments. However, one can even go back earlier to the mid-1980s where critics called the practice of contemporary IB (and Islamic economics) as *patchwork Islamization*, stemming from what they perceived as the islamization of knowledge agenda.[20] The argument was that since this agenda takes the modern discipline as the reference point and wants *to seek the relevance of Islam to it*[21], this can only result in patchwork and bad imitations.

This criticism could have some truth to it if one was to take the simplistic and shallow understanding of islamization of knowledge that seems to have prevailed among some proponents of IB and those who have misunderstood what IOK was, especially from those practitioners of IB and those who support the patchwork approach. In addition, the criticism of IB practice should not have been equated with efforts to develop Islamic economics as even Islamic economists were critical of the practice of IBs. In one stroke, the criticised IB practice also unfairly implicated Islamic economics and the genuine agenda of Islamization of Knowledge.

This mis-guided and narrow approach in IB resulted in prioritizing banking and finance instruments without giving due emphasis to *foundational issues* that would have included developing and applying a consistent philosophy of Islamic economics and finance. This has led to the acceptance of the banking institution as is, without understanding the history and foundations of modern banking itself and its role within an economic system. Hence, according to these critics, what has been attempted is to mould conventional banks into Islamic shape by purging them of interest and replacing it (or at least trying to) with profit-loss sharing arrangements. From the experience of Islamic banking over the last 40 years or so, we now see that this has actually not happened. Instead of equity instruments like *mudhārabah* and *mushārakah*, Islamic (commercial) banks have actually focused almost exclusively on debt instruments such as *murābaḥah* and *bayʿ muʿajjal* or *bayʿ bi-thaman ʿājil.* Islamic economists initially argued against such debt instruments being given too much prominence by Islamic banks because of their relatively lower developmental impact. The CESF discourse now allows us the opportunity to take IBF back to its Islamic economics roots.

[19] Mahmoud Gamal is Professor at Rice University in Texas, USA. He has a series of papers that has critically evaluated- some would say unfairly- the practice of contemporary IB. See his blog page: www.ruf.rice.edu/~elgamal/.

[20] Ziauddin Sardar was one of the earliest critics of Ismail Faruqi's Workplan on Islamization of Knowledge. While harsh, and in places overly so, a few of these criticisms were actually incorporated in modified versions of the workplan and in later works that developed on the IOK agenda. See Haneef (2009).

[21] This is taken from step 5 in Ismail Faruqi's IOK workplan (1982).

c. *Debt Based IBF in Theory vs Debt-Based IBF in Practice*

The tensions that existed in the 1980s and 1990s continue to exist today between the ideals of IB initiated by pioneering Islamic economists in the 1970s with the practice of IB. It continues to be debated today. Unfortunately, *sharīʿah* compliance has increasingly come to mean the minimum legal standards that are permissible, rather than aiming to determine preferred options that would have a greater socio-economic impact on society as a whole in relation to developmental goals such as poverty eradication, job creation, entrepreneurial development, greater concern for social impact in society and greater sharing and distribution of benefits (and losses). Economics, a discipline that focuses on dealing with 'making better/best choices' could/should have played a role in improving the role and contribution of Islamic banks to the well-being of society. Unfortunately, there was actually a marginalization of Islamic economics from the Islamic banking practice discourse.

Even if we accept the less preferred options of debt-based instruments (like BBA, tawarruq and *bayʿ al-inah*- based contracts in Malaysia) the theory-practice divide is further aggravated when the practice of debt-based IBF does not necessarily follow the requirements of the theory of debt-based IBF. A 2008 High Court judgement in Malaysia[22] gave a verdict that stated explicitly that the "BBA as practiced in Malaysia was not a bona-fide sale" and for all practical purposes was more like a loan contract. Of course, this was opposed by the industry. On appeal, the presiding appeal court judgement found that the High court judge above had erred in his judgement, since *the BBA is a sale contract and not a loan*. A simple reading of this decision indicates that both judgements seem to be talking about different things: the appeal court was referring to the *theory of BBA*, while the High court was referring to the *practice of BBA* in Malaysia. Why is there departure between theory and practice. Why and how were the practices justified by the *sharīʿah* boards? This has brought into question the whole process of *sharīʿah* advisement and the qualifications of members of these boards.

d. *The IBF Advisement Process: Moving from Minimum Standards to Value Based Intermediation*

One controversial and sensitive area regarding the practice of IBF that has come under scrutiny is the role and qualifications of members of the *sharīʿah* advisory boards that govern

[22] See Datuk Abdul Wahab Patail, High Court Malaysia, Commercial Division, 18th July 2008. Judgement on various suits brought by a few Islamic banks against clients.

individual Islamic banks. Central to this questioning of authority in IBF practice is the issue of what qualifications are needed to become *shari'ah* advisors and what the scope of their duties should be. In the case of Malaysia, while there is no explicit requirement for Islamic law/ *fiqh* qualifications, the convention is that *sharīʿah* advisors should be trained in Islamic law. While not questioning the sincerity of these scholars, the issue may be more about the qualifications and understanding of these scholars of contemporary banking and finance, and one can add, to the economic framework that banks function in. While attempts have been made to improve the knowledge of these shari'ah advisors, there is still much to improve.

Besides the 'replication/ duplication' criticism, much deeper soul searching needs to be done by all involved. Is it possible for us to truly develop genuine Islamic alternatives if we are not trained in economics/ finance as well as the heritage? Is it possible to look at instruments from the purely legal reasoning angle dealing with contracts, without also knowing the economic and social implications of those instruments and how development as a whole is served?[23] Can we truly claim that the instruments that are being put forward are genuinely serving public interest if we do not see the bigger picture of the economic and social goals of society? Should we not also give the required attention to ethical (and not just legal) issues in the decisions that we make? Why are we satisfied to just have the 'minimum legal requirement' as the standard that we want to follow?

Bank Negara Malaysia or the Central Bank of Malaysia has put forward its Value Based Intermediation (VBI) agenda. Basically, VBI argues that finance- in this case Islamic banking/finance- must look beyond the individual profit motive. While welcome, VBI needs much more discussion and debate to ensure that it is a transparent, all- inclusive discourse and not to be monopolised by the same players who were championing the 'old school' of thought. Hence, while the instruments may be *fiqh* or legally compliant, they may not meet the requirement of being *sharīʿah* compliant in the true sense, since the *shari'ah* is much broader than law and consists of guidance (including laws, values, norms, principles etc.).

e. Financialization: Has IBF made a difference?

In terms of a definition, financialization refers to 'the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, both at the national and international levels'

[23] In this issue, M.N. Siddiqi (2007) pointed out the importance of understanding the 'macro-*fiqh'* dimensions of IBF on the economy and society as a whole as opposed to the 'micro-*fiqh'* qualifications of most legal scholars.

(Epstein, 2001, p.1). Its principal impacts are three,

(1) to elevate the significance of the financial sector relative to the real sector. For example, in 1973, the ratio of financial transactions to global trade was 2:1, in 2004 it was 90:1[24]; (2) transfer income from the real sector to the financial sector, shown by the increase in the share of return to owners of money capital vis a vis workers or labor[25]; and (3) a general increase in income inequality and wage stagnation. Intra-country studies have shown there is a growing inequality between the rich and poor in all countries, if not income, certainly wealth inequality.[26]

Additionally, there are reasons to believe that financialization may render the economy prone to risk of debt- deflation and prolonged recession. Financialization is "a pattern of accumulation in which profits accrue primarily through financial channels rather than through trade and commodity production Kripner" (2005, p. 2). Financialization also entails the internalization of finance at the level of corporate groups, where transnational corporations control the operation of financial markets. Many corporations even create independent financial companies and carry out credit operations. Simply put, the financial sector no longer serves the real economy, but rather permeates and dominates the real economy.

If we are all in agreement of the above, what has been the performance of leading IBF countries vis-à-vis these features of financialization? Has the introduction and development of IBF made a difference to the issue of inequality, dominance of the financial sector, the rise of debt as well as environmental degradation? The short answer seems to be that Countries that have introduced IF do not seem to have been spared from these, but this is more an intuitive statement. Much more serious research is needed.

The financial sector has gained stature and importance over the trade/ manufacturing sectors. Many Muslim countries are rushing to become 'Islamic finance' hubs. Huge numbers of people seek employment in the Islamic banking/ finance industry rather than become entrepreneurs or work in manufacturing. Inequalities have increased in many Muslim countries. Despite the claim that Islamic banking is more stable since financial transactions

[24] For the figures quoted in this paragraph, please see Thomson and Dutta (2015), *A Primer on Financialization*. P. 6-14.

[25] As an example, the average trading in foreign exchange for WTO countries in April 2013 was USD 53.9 trillion whereas average total trade in goods and services for WTO countries in 2012 was USD 58.9 billion, meaning that what is traded in foreign exchange in less than a week is more than the total trade in goods and services for one year!

[26] Thomson and Dutta (2015) quote an UNCTAD study that shows that USD 800 billion of capital flows have actually moved from developing countries to developed countries in 2008, thus showing the domination of the rich over the poor

always have an underlying real asset, the pressure to 'replicate' and to allow increasingly more assets to be considered 'real' is a genuine challenge to our Islamic banks, especially to the members of the *shari'ah* committee. Rather than always limiting views to the legal/ fiqh dimension, Islamic banks and Islamic banking regulatory authorities particularly, must adopt an approach that promotes and upholds Islamic banks as having an economic and social role to society as a whole, and not merely to narrowly defined shareholder interests.

While IBF has been acknowledged in various studies to have been safer /more stable during the 2008 financial crisis, it is too early to celebrate. Islamic banks have been involved in various activities that seem to be features of financialization, but in a very cautious way. That is the best way to proceed. In tandem, studies need to be conducted to determine how much Islamic banks/ finance have either contributed to raising inequalities; or has contributed to reduce it, or at least slow down its pace? It is also very important to conduct social impact studies of IB in various communities. Issues of basic needs as well as general well-being of society cannot be left to the government or the voluntary sector. IBs must play their role in providing for society, not just for those with money. However, we need to change the present trend and direction of development. The CESF discourse allows us the opportunity to do so.

4. Genuine Islamization of Knowledge: The Role of CESF

Islamic scholars would agree if we said that the shari'ah is a complete code of guidance for human beings. In the case of economics, banking and finance, we are talking about a social science that tries to understand, analyse and describe human interaction and choices made in areas of allocation of resources, distribution, exchange and finance (among others). Though the category of finance involves the creation of financial instruments, it should not only be limited to this. Hence, what we need is not only 'instrument development and legal guidance', but guidance that also covers ethical choices and choosing 'better' alternatives.

This realization has to be incorporated into the Islamic economics and finance education curriculum, so that these values are inculcated and reflected in the academic and research of future graduates who are a product of such an education system. It should also be institutionalised in our current Islamic financial system. The CESF discourse that is now gaining prominence in global circles is a discourse that calls for a fundamental change in the way economic and financial decision-making is done. The entire philosophy and approach to decision-making adopts a radically different path.

a. Genuine Integration of Knowledge: Islamization and Relevantization Applied to Economics and Finance

The Integration of Knowledge agenda consists of two components. One the one hand, we have modern knowledge/disciplines that are a product of the western civilization and experience. On the other hand we have our Islamic turath or legacy/heritage. Both these two components need to be critically evaluated and then consciously 'integrated' using a methodology that is able to handle both components. The critical evaluation of modern disciplines undergoes 'dewesternization' followed by 'infusion' of Islamic elements; the critical evaluation of our legacy/heritage requires 'filteration' of time-space concerns as well as cultural elements and to make the heritage 'relevant' to our current environment. The goal is to develop contemporary bodies of scientific knowledge or disciplines that represent both our revelation and universe as twin epistemological sources of knowledge.

In discussing methodology of integration, we have to develop this as well since the current bodies of knowledge we have are not able to represent the genuine integration needed. On the one hand, modern knowledge/disciplines are a product of mere reason and observation; on the other hand, our heritage/legacy is overly 'text' oriented. In addition, when discussing social sciences, the use of empirical methods in our heritage, while acknowledged, is quite lacking. More often than not, when we talk of the methodology that needs to be adopted, the discipline of *uṣūl al-fiqh* (understood as more legal reasoning) is referred to. This must be distinguished from *uṣūl al-iqtiṣād*, the latter including a much broader area of the foundations/ methodology of Islamic economics. The latter will also be open to including the CESF discourse into its methodological approach.

Rather than only being limited to the legal dimension of the heritage and its methodology, *uṣūl al-iqtiṣād* would be based on the Islamic worldview and would benefit from inputs covering *uṣūl al-ʿilm* (sources or foundations of knowledge), *fiqh* and *uṣūl al-fiqh*, *uṣūl al-dīn*, history, analytical techniques as well as empirical techniques that would enable holistic decisions to be made; decisions that will enable the 'more preferred choices to prevail, and decisions that will take into consideration a wider end-result that represents public interest and civilizational goals of Islam and its *shari'ah*.[27]

Hence the knowledge of the heritage required to develop contemporary Islamic economics banking and finance must be more than just the narrowly '*mis*-defined' *sharīʿah* (legal) sciences. One of the greatest maladies to befall the Muslims is this *corruption* of original, rich

[27] On the discussion of *usul al-iqtisad* see Haneef and Furqani (2007).

meanings of terms and concepts in the Islamic worldview to narrow meanings.[28] As far as modern economics and banking/ finance education are concerned, meaningful Integration/slamization cannot occur without some level of critical understanding of the functioning of the modern economy, its system and constituent elements.

The use of the word 'critical' indicates that the modern system has to be evaluated- understanding where it is coming from but able to evaluate it *from an Islamic framework or perspective*. Knowledge in this category would include areas such as economic history (both of thought and practice), statistics (including today's econometrics), theory (both macroeconomics and microeconomics) and economic sociology (which may include other social sciences). One must also be prepared to include elements of sociology, logic, psychology and philosophy in its connection to economics.[29]

In the context of developing Islamic economics, it would be necessary for us to 'master' these areas of knowledge- understanding their origin, development and current state- but always with reference to the Islamic perspective. In terms of economics, banking and finance, this would mean understanding contemporary advances in these areas *critically*. The author disagrees with the proposition that a blanket rejection of modern knowledge is required. The teachings of the Qur'an, example of the Prophet pbuh and of Muslim civilization denies such blanket rejection.

Meaningful Islamization implies that the Islamic economist or the Islamizer of contemporary economics, banking and finance must know what is acceptable, what needs modification (what is to be done and how to do it), what is to be rejected (what and why) and to be able to relate these to contemporary realities as well. On the other hand, the Islamizer must also have some understanding of the Islamic heritage and how to relevantise it. This is certainly a tall order and one that does not seem possible if we continue to move in the present way contemporary Islamic banking products are being developed. While bankers are not necessarily familiar with the rich Islamic heritage, the *sharīʿah* (Islamic law) scholars are not necessarily familiar with the running of the economics and finance sectors and the macro-impact of the latter on the former.

[28] For detail arguments on the 'loss of adab' and the corruption of knowledge theses, see the works of Professor Al- Attas, especially his Prolegomena (1995).

[29] See Joseph Schumpeter (1994), History of Economic Analysis, Routledge, London.

If people are questioning present day products, it is not necessarily only for their legal validity but also for their economic, social and ethical implications. The CESF discourse provides this more holistic approach and paradigm to develop IF. However, make no mistake- the CESF discourse also needs to be critically evaluated.

5. The Circular Economy and Social Finance Discourse: Opportunity for A New Decision Making Model

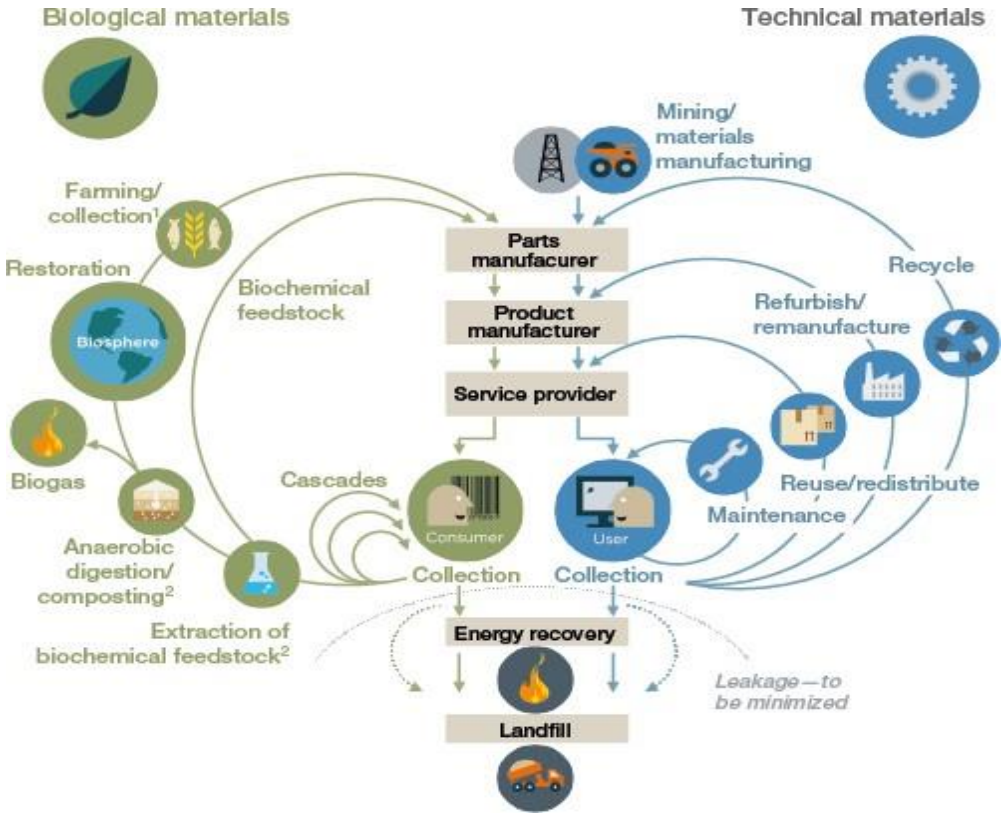
a. Circular Economy

A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life.[30]

The circular economy is presented as a system of resources utilization based on 3 Rs where reduction, reuse and recycling of elements prevails: minimize production to a bare minimum, and when it's necessary to use the product, go for the reuse of the elements that cannot return to the environment. That is, the circular economy promotes the use of as many biodegradable materials as possible in the manufacture of products - biological nutrients- so they can get back to nature without causing environmental damage at the end of their useful life. When it is not possible to use eco-friendly materials -technical nutrients: electronics, hardware, batteries... - the aim is to facilitate a simple uncoupling to give them a new life by reintroducing them into the production cycle and compose a new piece. When this is not possible, it will be recycled in a respectful way with the environment.[31] One immediate comment on the 3Rs of the circular economy could be the need for 4Rs where the first R is 'refuse' (rather than reduce), in other words to reject consumerism.

Unlike other economic models where the economic aspect prevails over the social or environmental, circular economy is a substantial improvement common to both businesses and consumers. Companies that have implemented this system are proving that reusing resources is much more cost effective than creating them from scratch. As a result, production prices are reduced, so that the sale price is also lowered, thereby benefiting the consumer; not only economically, but also in social and environmental aspects.

30 http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy
31 https://www.activesustainability.com/sustainable-development/what-is-circular-economy/



The circular Economy in a diagram[32]

More research into the Circular economy and how Islam views it is required. However, what is clear is that the circular economy discourse asks that economic decision making must go beyond the limited goal of individual gains/interest. Concern for society and nature will have to be incorporated. The issue of sustainability- that has gained prominence in the last 5 years or so due to the UNs Sustainable Development Goals agenda - is central in Islamic economics since the nature of Allah as Rabb (lord) means that not only is he the creator and provider, but He is sustainer as well.

b. Social Finance

What is social finance? In the finance paradigm, social finance is seen as 'investment decisions that not only give a financial return, but also have positive social and/or environmental impact'.[33] Hence social finance still makes a financial return (could be less than return under pure business criteria), but also does greater good to others in the process.

[32] http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/from-linear-to-circular-accelerating-a-proven-concept/

[33] The four broad areas covered under this include socially responsible investing/finance, environment finance, development finance (including microfinance) and impact investing. See Tim Rourke, *From ESG to SRI*, Knowledge Leadership, CIBC Mellon a Canadian Company that specializes in social finance.

It can include schemes and programmes that make economic resources (including funds/financing) available to those segments of society who otherwise may not have access to these resources. It could also involve a social/environmental goal that requires funding due to lack of public funds per se. It seeks to balance between material profits and social good. This is where social finance can serve the circular economy paradigm. It works by taking the individual, society and the environment into account when making decisions. Put in another way, it requires a 'multi-objective profit function' that also incorporates 'interdependent utility functions'. Pioneer Islamic economists in the 1970s put this idea forward but this seems to have faded away from the discourse.

In recent years, there has been interest in talking about Islamic social finance (ISF). While welcome, the effort has been limited to discussing zakat, waqf and Islamic microfinance. While these three institutions are important areas/institutions of ISF, it is still a very narrow approach to the social finance discourse mentioned above. It is very important that ISF discourse be widened to include all areas of finance- including Islamic banking- since what is crucial is to see a new model of decision-making develop. Hence, ISF should also argue for a banking, capital market (for example sukuk) as well as all other investment funds that have a 'social impact'. Hence, we mainstream thinking of others/environment in all our decision making. The circular economy paradigm is an ideal project to combine with social finance discourse since the central idea is about a new decision-making model.

Many may not be aware, but this is not new to Islamic economics. In the late 1970s and early 1980s, pioneers of Islamic economics asked this question- 'is the goal of the firm only to maximize their financial profit'? While the answer was a 'firm no' (no pun intended), the details of how you would do this and show this theoretically, did not get sufficient attention. Faced with the available calculus tools of analysis used in standard economics, it was counter-argued that we should continue to use the 'maximization' hypothesis but change the function/goal that was to be maximised.[34] This argument may have been a good 'solution' to the debate, but unfortunately, not enough theoretical work followed to build on these ideas. Hence, the standard maximization rule was 'purified' without detailing out the components that had to be included in the profit/objective function and the constraints or limitations that represented Islamic considerations.

With less interest in 'theoretical' model building, the matter was generally left to rest. As time

[34] Mahmoud Saud in the 1970s and later Zubair Hasan in the early 1990s, put forward this view and generally made the theoretical argument.

went on, the standard view was that Islamic economics utilised a modified maximization rule. Unfortunately, this modified' elements were not put in place and gradually in most discussions including that of Islamic banking and finance, it was forgotten. In the world of Islamic banking, the maximization rule was taken as 'given'- the goal of the Islamic bank is to maximise profit or to maximise shareholder income/wealth- but following shari'ah (read as fiqh or law) requirements. It is always re-iterated by proponents of current IBF industry that IBs are 'tijari' entities and not welfare organizations. Without the capital of the shareholders, there would be no business, hence we should be fair to the shareholders.

While this was the discourse 30 years ago, things have changes drastically. From CSR discussions in the later part of the 1990s this question of 'role of corporate entities' and especially banks have come under scrutiny. With the advent of social business discussions and more recently the Circular economy discourse, the idea of greedy, self-interested maximisers has come under scrutiny again.

c. CESF Discourse and a New Model of Decision-Making

As mentioned above, when we talk of Islamic social finance, interestingly enough, one does not see the discussion of social finance as given in the west. Rather than discussing modifications to the business sector (as found in the conventional discourse of social finance) as well as the potential to bring the 'theory of the firm' back in focus- in Islamic discourse circles- to some extent, discourse seems to have been rather limited to our 3 institutions that 'represent Islamic social finance': zakat, waqf and microfinance/micro investment.[35] Hence, financing was made available to society as a whole and not just to the already well-to- do. In addition to these three institutions separately, some works have even tried to combine zakat and waqf with Islamic microfinance in order to be able to serve the ummah even better. However, the division of the Islamic economy into the tijari sector (private), siyasi sector (public) and ijtima'I sector (social/voluntary) has led to less discussion about the hybrid model as in the west. As mentioned earlier, until very recently, many 'Islamic bank experts' still insisted that the role of IBF is to maximize returns for their shareholders. It is as if the three sectors cannot be integrated. If we widen the discussion of Islamic social finance to include 'overall decision-making' of all forms (banks included), we then have a new model

[35] As for microfinance, Muhammad Yunus and Grameen Bank did something that many others could not. He managed to develop a system whereby the unbankable poor were the targets of microfinance schemes where group dynamics made collection and repayment an almost 100% success. There have also been criticisms, but as a whole, breaking the existing paradigm of 'collateral' and credit worthiness has been achieved.

of the firm. The 3Ps (people, planet and profits) model is what the circular economy paradigm brings to Islamic economics and finance. Stemming from the Islamic worldview and Islamic economic philosophy discussions about the nature of resources, the nature and role of man as 'abd and khalifah, the ethical principles that this brings in economics and finance plus the call for socio-economic justice and equity, naturally makes the circular economy and social finance discourse relevant.

If one was to just search for references on interdependent utility functions, one would be amazed that much theoretical work has been written. My utility depends on not only my consumption, but also on the consumption of others.[36] Drakopoulos (2012) carries out a historical study. The notion of interdependent preferences has a long history in economic thought. In its general form, it can be found in the works of authors such as Hume, Rae, Genovesi, Smith, Marx, and Mill, among others. In the twentieth century, the idea became more widespread mainly through the works of Veblen and Duesenberr. However, such preferences were never part of the corpus of orthodox theory. For instance, although Pareto and Marshall were aware of their existence, they did not advocate their incorporation into orthodox economic theory.

Hence, although much has been written, it has not been able to become mainstream. Bergstrom (1999) put forward a highly mathematical presentation of 'benevolent utility functions' but these alternative theories of decision making of economic agents must be developed by Islamic economists and be included in the analyses made from Islamic perspectives.

In Islamic economics, Zaman (2005) tried to present his alternative to consumer behaviour that tried to separate the demand function into two so that the consumption pattern for the poor will be acknowledged clearly. Chowdhury and Tageldin gave their own critique to this article. While one can find some work in this area, the reality of the matter is that these writings are just insufficient and in no comparison to the levels written by alternative economics in the west. Much more attention is needed to attract our young scholars to do research in these areas and to build theoretical models that reflect the Islamic perspectives on individual decision-making. The CESF discourse affords a golden opportunity to revive the interest in this.

However, while CESF provides the necessary intellectual motivation to re-energise the

[36] https://www.oxfordreference.com/view/10.1093/oi/authority.20110803100006606

Islamic economics and finance discourse, one must also be critical of the CESF discourse. A thorough evaluation of CE and SF from an Islamic perpective is needed, just as we would call for the critical evaluation of out turath and modern knowledge in the IoK agenda.

6. The Way Forward and Conclusion

Besides the overall need to situate IBF within the Islamic economic framework, other positive developments have taken place over the last 10 to 15 years or so. The CESF discourse allows a re-look at the economic and financial decision-making process of the agent- be it the consumer or producer. The rise of social/community banking has given alternative banking models other than the Anglo-Saxon commercial model. In addition, there must also be emphasis given to non-banking financial institutions such as development financial institutions (DFIs) and other community-based alternatives. One could argue that companies such as Malaysia's e-hailing GRAB transport service and Air BNB's accommodation service are all examples of a democratization of asset ownership that could actually bypass established institutions such as banks.

As far as microfinance is concerned, a new area of Islamic social finance has developed rather extensively over the last 10 years. Zakat and awqaf are also part of this Islamic social finance where commercial interests are balanced with societal interests. However, everyone must be vigilant to not 'over commercialise' the institutions of zakat and waqf. Already there are writings by more commercially minded entities that are calling for a greater role of Islamic banking in zakat and waqf management. Caution needs to be taken so that the noble aims of zakat and awqaf are not corrupted by crass material intentions.

The Islamic economic system is quite unique in that it is a three-sector system: private, public and voluntary or not for profit sectors. Each plays its own complementary role to achieve well-being for all. The private sector, in this case, commercial Islamic banks have to work together with other institutions to achieve the wider goals of society. This can only be effectively done if IB re-aligns with its Islamic economic roots. With some of the developments post-2008 crisis, the environment has become more conducive to receive alternative approaches to develop contemporary IB. The circular economy paradigm also allows us to seriously question the narrow approach taken in developing IBF of the last 40 years. Alternative banks, non-banking alternatives as well as more holistic solutions that call for structural reforms, including those in distribution and redistribution, are now being discussed even in mainstream conferences.

Islamic economics and finance should take the opportunity to participate in this movement for reform. After all, the Islamic concepts of *tajdid*, *islah* and *ijtihad*, are all central to achieving the well-being of the ummah. Islamic economics, banking and finance must genuinely solve problems of the ummah and not just provide legally compliant instruments that do not necessarily establish justice and wellbeing for all, and something that is central to the objectives of the *shari'ah*. In addition, just providing longer repayment periods to allow people to afford an already overpriced house, does not genuinely solve the provision of the basic human right of shelter, which is a crucial goal of the objectives of the *shari'ah.* Solutions must be sought in a framework where finance is unified with economics and the socio-economic goals of society. Islamic banks and banking authorities must take the lead.

There is an oft-repeated- and one of my favourites- saying in the Malay language- *'Kalau sesat, balik ke pangkal jalan'* (if you are lost, return to the beginning of the journey). In Islamic banking, there is soul- searching required and the way forward is to re-visit its Islamic economic foundations. Maybe the current discourse on circular economy and social finance will provide the incentive and impetus to re-connect IB to its roots. It is the responsibility of all to assist in bringing Islamic banking and finance home.

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- For writings of Mahmoud El Gamal see his blog at www.ruf.rice.edu/~elgamal/

- For works on the circular economy, see the following

  1. http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy

  2. https://www.activesustainability.com/sustainable-development/what-is-circular-economy/

  3. http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply- chains/from-linear-to-circular-accelerating-a-proven-concept/

Circular Economy Financing: Islamic Finance Perspective

Nafis Alam

Abstract

Achieving the goal of a circular economy depends on the creation of an economy where the "end-of-life" concept is replaced by the option of getting rid of waste through the superior design of materials, products, systems, and business models.

In order to achieve the full benefits of a circular economy, the model is reliant upon co-operation within sectors and supply chains, and across countries. But there is over-reliance upon the backing of financing and investors who recognise the risks of the linear system and can spot new opportunities. In order to maintain the spirit of the circular economy, providing an effective and sustainable source of finance is key for the financial needs of circular economy industrialisation. This paper will shed light on the perspective if Islamic Finance in financing the circular economy concept, especially the "green financing".

Introduction

Achieving the goal of a circular economy depends on the creation of an economy where the "end-of-life" concept is replaced by the option of getting rid of waste through the superior design of materials, products, systems, and business models. Circular Economy is a term that first appeared in the last decade of the twentieth century (Pearce and Turner, 1990), as an alternative to the traditional economic model and it is based on the basic principles of the laws of thermodynamics. However, the term remained in obscurity until it was first implemented by the Chinese Government in the wake of the twenty-first century, through an initiative called the "Circular Economy Promotion Law of the People's Republic of China" (Lieder and Rashid, 2016).

Instinctively, recycling is increasingly being just common sense and advancements in materials and focus on environmental sustainability are making the process easier for complex products as well. But the solutions of the circular economy are not immediate and the shift towards it remains marginal. In order to achieve the full benefits of a circular economy, the model is reliant upon co-operation within sectors and supply chains, and across countries. But there is over-reliance upon the backing of financing and investors who recognise the risks of the linear

system and can spot new opportunities. In order to maintain the spirit of the circular economy, providing an effective and sustainable source of finance is key for the financial needs of circular economy industrialisation. In this perspective, governments globally have been launching its Green Finance Strategy with the aim of increasing investment in sustainable projects and infrastructure.

In order to understand the role of financing and more specifically green financing we first need to understand the concept of circular economy and its position the new world. The concept of the circular economy is inspired by nature and its living systems. In nature waste does not exist, there is no landfill as materials flow constantly in circles. As humans, however, we have adopted a linear approach of production and consumption where we take, make and dispose of materials. While in a circular economy is all about keeping resources as long as possible in the production and consumption cycle, and thus reducing waste and enabling better utilisation of resources for less negative environmental impact. The aim of CE is to provide an alternative approach to the traditional (linear) economy model that is based on the concept of take-make-use-dispose (Morlet *et al.*, 2016).

A circular economy can be treated as a restorative and regenerative economic model intending to decouple economic growth from resource consumption. The transition to a circular economy requires a radical change in the way we produce and consume. In a circular economy, products are designed for durability, upgradeability, reparability and reusability, with a view to reusing the materials from which they are made after they reach the end of their life. In the use phase, products are managed with a view to maximising their utilisation capacity and extending their useful life, thus maintaining their value for as long as possible.

In order to achieve the goals of a circular economy, finance is going to be one of the key enabler especially the “green financing”. Green finance involves engaging traditional capital markets in creating and distributing a range of financial products and services that deliver both investable returns and environmentally positive outcomes. This involves internalizing environmental externalities and adjusting risk perceptions in order to boost environmentally-friendly investments and reduce environmentally harmful ones. Promoting green finance on a large and economically viable scale helps ensure that green investments are prioritized over business-as-usual investments that perpetuate unsustainable growth patterns.

Financing Circular Economy

Building effective circular economy infrastructure at a large scale is an unprecedented challenge which will require a large scale financing from both public and private sector. Green Financing can be used as a strategic approach to overcome existing shortcomings in relation to financing and risk mitigation and will allow the financial sector to make a major contribution in the transformation of circular economy and in the context of sustainability.

The main source of capital towards the circular economy can be divided into three major categories: public capital, private capital and hybrid funds.

Existing finanial products offered by public and private financiers can already open up a world of opportunities for entrepreneurs who would like to develop a circular business. While large businesses are often capable of financing the circular transition internally through retained earnings, young and fast-growing firms are often dependent on external financing for growth. Circular businesses or projects are considered more complex, thus resulting in higher risks compared to standard investment deals. This implies that investors would demand a higher premium on the capital they provide, a premium proportionate to the risk profile of the company or the project. To generate financing opportunities for the circular business, lenders and investors are expected to get used to the circular rationale as well. Only a few financial institutions especially banks are looking at it in a more structured way. ABN Amro, ING and Rabobank have created circular economy guidelines that they hope others will use and which define terminology and the role that finance can play in supporting a transition towards the circular economy.

In order to increase the availability of green financing for circular business, governments can support innovation on the supply side by increasing their direct budget allocations, which can provide flexibility for funding priority circular economy programs and mainstreaming green innovation with current development programs. Green business incubators and other similar venture support programs (including early-stage venture funding support) via government or multilateral agency interventions can also play a vital role in helping smaller firms scale up the objectives of a circular economy. The UK is taking a lead in such initiative by launching its Green Finance Strategy with the aim of increasing investment in sustainable projects and infrastructure. The strategy is part of the UK's goal to meets its recently announced target of reaching net-zero carbon emissions by 2050.[37]

[37] https://www.circularonline.co.uk/insight/government-launches-green-finance-strategy/

Following the strategy announcement, HSBC UK Commercial Bank has announced it is supporting British companies to meet their environmental and sustainability goals with the launch of a new green finance proposition. The new range – available for small to medium enterprises (SME) through to large corporates – includes a Green Loan, a UK industry first Green Revolving Credit Facility (RCF) and a Green Hire Purchase, Lease and Asset loan.

In the capital market sphere, bonds also represent a large share of global financial flows with around US$100 trillion outstanding globally. The majority of these (around 75 per cent) are issued in developed countries – mainly the United States (40 per cent).[38] Green bonds offer an opportunity to provide much-needed finance to support circular businesses. Green bonds proceeds can go specifically to low carbon climate-resilient projects as well as can be used to finance utility-scale renewables, energy-efficient buildings and large-scale transport infrastructure.

The opportunities are abundance to support the cause of circular businesses but many funding bodies and investors are not familiar with the circular economy, and in particular with the correct assessment of risks (linear and circular) and opportunities, which hampers the bankability of circular economy projects and businesses. It is essential that more knowledge is developed (assessment guidelines and methods, associated indicators/metrics, etc.) and disseminated, and more training provided to understand the concept of Circular Economy.

The core of the problem lies the techno-economic appraisal, the assessment of the financial impacts of circular economy projects, and the availability of associated key indicators. Among other things, this will allow stakeholders to better manage and assess circular projects and business plans, and as such increase their financing prospects (bankability). Further adding to the issue is lack of clarity on the financial/industrial scope of a 'circular economy' projects and insufficiently developed risk assessment methodologies for circular projects and businesses. Funders are also unaware that how can a linear investment be made circular, by, for instance, changing an existing company's supply chain and production process to eliminate negative impacts on the environment and reach zero waste or by changing the eligibilities/requirements of new/existing financial instruments.

In this context, Huifang (2018) has provided some relevant financing policy tools and acting mechanisms for promoting the circular economy:

[38] OECD, *Mobilising Bond Markets for a Low-Carbon Transition*, Green Finance and Investment, 2017

Financing Policy Tools		Main Benefits and Acting Mechanisms
Greening Bank System	Discounted Green Loans	Reduce the cost of funding for green projects.
	Lender Liability	Strengthen the social responsibilities of investors; impede the availability of funds for polluting projects by increasing their financing costs.
	Green Banks	Increase the return on green investment and reduce the investment risk and cost of private capital for green projects by leveraging the economies of scale and specialised services and operations.
Greening Capital Market	Green IPO	Facilitate efforts by green companies to raise funds; indirectly reduce financing costs.
	Green Bonds	Reduce the cost of funding for green projects.
	Green Funds	Build up the economies of scale and specialised green services and operations; reduce the cost of green investment.
	Green Equity Indices	Indirectly reduce the investment costs of green projects by channelling more funds into green industries.
	Green Insurance	Expose environmental risks through insurance policies, which indirectly increases the costs of polluting projects and discourages investment in such projects.
Green Capacity Building	Carbon Markets	Drive down the cost of emission reductions through market mechanisms.
	Green Ratings	Reveal environmental risks; reduce the investments in polluting projects by increasing their costs; reduce the financing costs of green projects and foster more of these projects by showing their positive externalities.
	Environmental Cost Database	Increase the accessibility of environmental information and reduce the cost of environmental impact studies.
	Green Investor Network	Increase investor companies' preference for green projects through pressure from institutional investors; increase investors' preference for green projects through online educational programmes.
	Compulsory Disclosure	Encourage (discourage) companies to invest in green (polluting) projects by emphasising greater corporate social responsibilities.

Source: Huifang (2018).

Islamic Finance and Circular Economy

As the world economy is gradually moving towards adopting a circular business model and more sustainable development initiative, the Islamic finance industry has tremendous opportunities to develop Shariah-compliant financing facilities to meet the expanding liquidity requirements in this sector. Islamic finance has substantial synergies with the sustainable circular business concept and fits in well with the objectives of a circular economy.

One important accelerator in Islamic finance to drive a circular economy can be leveraged on the green Sukuk which can act as a catalyst for the circular business financing needs. Green Sukuk lies at the intersection of three investment trends: Islamic mutual funds, socially responsible investments (SRI), and Sukuk. Proceeds from green Sukuk can be used to finance

construction or the payment of a government-granted green subsidy. The structure of green Sukuk involves securitizing future income cash flows from ring-fenced projects or assets with specific criteria.

Green Sukuk have several advantages over other private funding sources. Firstly, they represent a tradable capital market instrument, which has the potential to allow for transferability and ease of exit. Secondly, green Sukuk can be based on a pool of portfolio projects, which generally entails risk diversification, resulting in a low required return threshold. This could be a way to address the current economic feasibility challenges in circular business positioning. Green Sukuk proceeds can be used to finance projects which are (a) contributing substantially at least one of the global environmental objectives namely (i) climate change mitigation, (ii) climate change adaptation, (iii) sustainable use and protection of water and marine resources, (iv) transition to a circular economy, waste prevention and recycling; (v) pollution prevention and control and (vi) protection of healthy ecosystems.

Green Sukuk represents an untapped financing means for circular business initiatives in major Islamic finance countries such as MENA and SEA countries which are at the forefront of Islamic finance. As green Sukuk signify a good mix between the positive features of green bonds (with their ethical environment-friendly orientation) and the attractive features of Islamic finance (with its asset-backed attributes), they ought to have a growing demand in the near future. Green Sukuk is a great enabler to fund circular business-friendly projects, in particular in the field of renewable energy generation and waste recycling.

With the growing need to finance enormous circular business projects and do so with low-cost alternatives to traditional bank financing, Islamic financing such as green Sukuk can provide a very plausible investment solution. Moreover, as Sukuk is the preferred choice of investment amongst Islamic financing options, green Sukuk can be used as a preferred investment vehicle to finance the circular businesses ambitious projects.

Way Forward

The issue of risk and the unfavourable risk/revenues profile of circular economy projects dominates the financing need of the projects. It seems to be counterintuitive that the approach that preserves the economic value of materials and products faces the problem of revenue generation and uncertainties, resulting in a high financial and financing risk which can be overcome by innovative financing instruments such as green Sukuk. Funding bodies such as banks and investors are aware that circular economy projects are not necessarily inherently

riskier than linear projects, especially from the long-term perspective. But, it is rather that the regulatory system, markets and financial risk assessment are distorted and biased in favour of the financing of linear projects thus making it difficult for them to finance circular economy projects.

It should be a wholehearted effort from financiers, regulators, policymakers and to push for the long term value creation and longevity of circular business projects which will help the circular economy to become the main priority among the sustainability domain. All global stakeholders need to understand that the development of the circular economy is not only beneficial to the effective protection of the ecology and the sustainable exploitation of the resource but also to long term survival of the world and humanity.

To overcome the financing challenges of circular businesses, there should be a collaborative effort amongst central authorities, local governments, financial institutions, and enterprises towards the establishment of a sustainable financing mechanism. To provide the needful financing for circular businesses, governments have a key role to play in strengthening domestic policy frameworks, better aligning and reforming policies across the regulatory spectrum to overcome barriers to circular economy investment, and providing an enabling environment such as green financing and green Sukuk options that can attract both domestic and international investments.

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Circular Economy, Green Economy, and Sustainable Development: Establishing the Interconnections and Discoursing the Role of Islamic Finance

Abdul Rashid & M. Abubakar Siddique

Abstract

Despite the large amount of hits on the concepts of Circular Economy (CE), Green Economy (GE), and Sustainable Development (SD), there is a dearth of coherent understanding of the interconnections between these concepts. Although the academicians, practitioners, and policymakers at both national and global levels as key sustainability avenues are currently considering the three concepts, there is a dire need to understand the interconnections between them. Knowing and identifying the integral role of Islamic finance in promoting and enabling the operationalization of the concepts is also indispensable for policymakers, businesses, and financial institutions. Therefore, the aim of this paper is to sketch out a broad and holistic framework to establish the interconnections between CE, GE, and SD. To achieve this objective, the paper first presents the existing views and then discourses the connections between the concepts, goals, and practical strategies. The second objective of the paper is to link the principles, responsibilities, objectives and business models of Islamic finance with social, economic, and environmental sustainability. Further, the paper aimed at pointing out potential dimensions, scopes, and in-built characteristics of Islamic finance that may facilitate the process of the realization of the CE, GE, and, SD targets and objectives. The paper suggests that both CE and GE are rooted in the ideas of eco-efficiency, resource efficiency, renewable energies, low carbon emissions, and improvement of nature capitals. On the other hand, both CE and SD mainly focus on intra and interrogational commitments, integration of non-economic aspects into development in order to achieve sustainable production and conception patterns. It has emerged that the conceptualization, implementations, and evolution of CE, GE, and SD highly assimilate the ingredients of resource efficiency and decoupling, sustained and inclusive economic growth, preservation of environment, and promotion of sustainable consumption and production patterns. The paper indicates that the role of Islamic finance is essential in harvesting the benefits associated with all three concepts. The Shariah-compliant business models and products of Islamic finance provide an edge to Islamic banks over their conventional counterparts to provide financing at all stages to promote the CE, GE, and SD

activities. Finally, the paper proposes a business model based on Musharkah cum Ijarah for enhancing the transformation of linear economy towards CE.

JEL Classification: G29; O44; Q01; Q53; Q55; Q56; Q57

Keywords: Circular Economy; Green Economy; Sustainability; Environment Preservation; Islamic Finance

1. Introduction

Although there are evidently different assumptions, operationalization strategies, theoretical approaches, and conceptual discussions, the concepts of sustainable development (hereafter SD), green economy (henceforth GE), and circular economy (henceforward CE) are considered a common avenue to conciliate economic environmental and social goals (Korhonen et al., 2018; Geissdoerfer, 2017; Schroeder et al., 2018; D'Amato et al., 2019). All three concepts are currently being mainstreamed most vigorously at both the national and global levels among both scholars and policymakers as key development and sustainability avenues.

The three concepts are trending among academia, researchers, practitioners, and policymakers. This is evident by the rapid growth of peer-reviewed papers on these concepts and the increasing number of journals covering these topics within the last two decades. Further, many consultancy reports have recently been published on these topics. For example, the major consulting firms Accenture, Deloitte, Eyard and Mckinsey and company, European Union Commission, the United Nation Environment Programme (UNEP), Organization for Economic Co-operation and Development (OECD), the Europe 2020 Strategy, EU Action Plan 2015, United Nations 2030 agenda, World Business Council on Sustainable Development (WBCSD), International Chamber of Commerce (ICC), Waste and Resource Action Program (WRAP), and Stakeholder Forum, BioRegional and Earth Charter (SFBEC) all have published several reports on CE in recent past (Gartnor, 2016; Hannon et al., 2016; Lacy et al., 2014; Hestin et al., 2016; EY, 2015). The awareness of the opportunities and potential benefits associated with the circular economy is significantly increasing among companies and in fact, they have started to harvest advantages of the CE systems for themselves and their stakeholders (EMF, 2013b). In recent years, these concepts have gained increased attention from academic scholars (Chertow and Park, 2016), international development practitioners (Gower and Schroeder, 2016), multinational firms (Lacy et al., 2014), policymakers in developed countries (EC, 2015), and some emerging economies such as China (Yuan et al., 2006; Mathews and Tan, 2011), Further, the governments of several other low- and middle-income countries have also started

to implement the CE and GE systems for attaining sustainability at local, national, and international levels.

These concepts are of great interest to the academician and practitioners because they are viewed as operationalization for businesses to implement the concept of sustainability (Ghisellini et al., 2016; Murray et al., 2017). The sustainability concept has been considered too vague to be implementable and thus, it has started to lose its momentum (Van den Brande et al., 2011; Peltonen, 2017; Naude, 2011; Engelman, 2013). This is partly due to heterogeneous interpretations and applications of sustainability (Munda, 1997; Neumayer, 2003). This is also partly because a wide variety of sustainability concepts and a large number of different practical strategies of its implementations and a range of suitable indicators to gauge its performance are proposed in investigations, policymaking, and private governance. Both the green economy and green growth concepts should be considered essential to operationalize sustainable development for businesses (UNEP, 2011; OECD, 2016).

Undoubtedly, the sustainability concept has emerged as one of the most pressing challenges of our age. The concept has been mainstreamed in the global research and political agenda for the last couple of decades (Guard and Gehman, 2012; Markard et al., 2012). However, it is extremely challenging in policymaking to the simultaneous achievement of economic, social, and ecological goals together (UN, 1987). For achieving local, national and global corporate sustainability, there is a need for greater identification and understanding of contemporaneous requirements in a holistic and inclusive manner for attaining social-ecological objectives. Some researchers are of the view that linking visions and targets of policymakers, practitioners, and businesses to fundamental sustainability goals and issues is vital for attaining long-term social-ecological sustainability at different levels (Addison et al., 2018; Bjorn et al., 2016; Whiteman et al., 2013).

The main motivation behind our choice of these three concepts is the fact that they all are, highly considered to adapt to or currently transform the current linear economic system (take-make-waste) towards a more resilient and sustainable one. Some authors have emphasized the interconnected role of CE and GE in achieving sustainability (Loiseau et al., 2016). Some other investigations, such as Ouikoinom (2014), Hagemann et al. (2016), Szekacs (2017), and D'Amato et al. (2017), have also pointed out the relationship among these concepts. Similarly, studies such as Kirchherr et al. (2017) and Murray et al. (2017) have discussed the connections of CE with the goals of sustainable potential development. These studies have also related the social objectives of CE with the concept of sustainable development.

Due to technological advances, design and better recovery processes, better waste management systems, companies are able to elaborate and implement more practical CE strategies within the industrial ecology framework (Hobson, 2016). These advancements also encourage companies to reduce the use of raw material and waste production. As a result, companies will get environmental and economic benefits (Anderson, 2007). In fact, one of the main reasons for the broadness of the concept of CE is its capability to convert various divergent strategies from different schools of thought (Matus et al., 2012). Examples of these schools are cradle-to-cradle design (Braungort et al., 2007), zero waste (Pauli, 2010) and cleaner production (Dejesus et al., 2016).

Despite several flexibility and abilities of the CE concept, there are several conceptual, theoretical, and practical issues concerning the importance of CE. For instance, the considerable disparities between theoretical approaches to the CE concept (Bocken et al., 2016) make difficult to define theoretical framework, which is widely accepted theoretical framework will definitely provide basis for the development of strategies and the implementation of CE systems (Kalmykova et al., 2017, Korhonen et al., 2018b).

Further, some studies, such as Sauve et al. (2016) have pointed out that the theoretical aspects of the CE are very poorly linked with the practical paradigm. Despite the fact that CE models are being implemented at micro, meso, and macro levels (Geng and Doberstein, 2008), there is a dire need to consider CE goals and principles in a better way and they should be translated into action in more effective ways (Pauliuk, 2018). Further, more coordinated actions are needed at all levels of implementation. One way to overcome such issues and challenges is to holistically link the goal of CE to economic, social, and environmental sustainability.

Knowing how the conceptual paradigms, theoretical frameworks, and practical strategies of CE, GE, and SD are interconnected will help adoption and transformation of the current linear economic system towards a circular economic system, which will not only result in long-term local, national, and global sustainability but enable us to achieve social-ecological goals in an effective manner. Therefore, the first objective of the paper in hand is to sketch out a broad and holistic framework to establish the interconnections between CE, GE, and SD. To achieve this objective, the paper first presents the existing views from academic research and the other stakeholders' viewpoints. Next, the paper attempts to discourse the connections between the concepts, goals, and practical strategies.

The role of finance is very critical not only to start up but also in the accomplishment of any business. Indeed, finance is required at each stage of a sustainable business model. In particular, it requires at the stage of the conceptualization of the idea (capital required for initial evolution,

cost-benefit analysis, feasibility analysis, etc.), practical implementation of the conceptualized model (required seed capital for purchase of machinery, land, and other equipment and staffs), enlargement and progression of the implemented business model (e.g., expending business local to national level, internationalization, etc.) and finally to attain the maturity stage of the business plan (financial and economic sustainability, self-reliant).

Given the fact that Islamic banking business models are more resilience (Hasan and Dridi, 2010) and protect Islamic banks from the negative impacts of economic and financial crises (IMF, 2010), Islamic banks perform better and contribute more effectively in the stability of financial sector (Rashid et al., 2017), it would be worth knowing the potential role of Islamic finance in promoting to and harvesting the benefits associated with CE, GE, and SD. This objective of the paper is achieved by linking the principles, responsibilities, objectives, and business models of Islamic finance with social, economic, and environmental sustainability. Further, the paper highlighted potential dimensions, scopes, and opportunities that Islamic finance has for facilitating the process of the achievements of the CE, GE, and SD objectives and targets.

The remainder of the paper is organized as follows. Section 2 presents the definition, dimensions, and conceptualization of SD. Section 3 outlines the definitions, characteristics, and different aspects of GE. Section 4 is dedicated to CE. It discusses the origin, definition, and business models of CE. It also presents the flow chart of CE. Section 5 establishes the interconnection among the CE, GE, and SD concepts. Section 6 contains the discussion of the role of Islamic finance in achieving social, economic, and environmental objectives within the framework of CE, GE, and SD. Finally, Section 7 summaries the arguments developed in the paper.

2. Sustainable Development

Even in these days, the world is facing several traditional development issues. Examples of these issues are economic stagnation, willing inequality, persistent poverty, high unemployment, hunger, and illness, etc. Further, the world is also facing several newer challenges such as natural resource depletion, intensification of global warming, rise in new levels, air, water, and soil pollution, biodiversity loss, environmental degradation, and excessive land use (Geissdoerfur et al., 2017). Further, low productivity, inefficient and deregulated market structures, and disturbances in economic and financial markets currently

are among the major and serious concerns of the world (Sachs, 2015; Jackson, 2009; Banorjee and Duflo, 2011; Parhaled, 2004).

From the last several decades, governments, businesses, consultancy firms, NGOs, and various other stakeholders, such as the academicians and practitioners are seriously looking for new, cost-effective, permanent, and applicable solutions. The concept of sustainable development, which is also termed as “development which lasts" (WCED, 1987) has considered one of the appropriate and key approaches for providing solutions to these issues.

The sustainable development concept was the first time presented in the paper of the Brundtland Commission, our common future (Bruntland, 1987). Nowadays, there are several definitions of sustainability. According to Johnston et al. (2007), more than 300 definitions of term sustainability exist in the literature. However, the Brundtland Commission provided the most practical suitable and most commonly worldwide-accepted definition of sustainability. According to Brundtland report sustainable development defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

In the context of this definition, two fundamental questions arise. First, what exactly should be sustained within the framework of sustainable development? Second, how it should be sustained? The economic literature provides two far-reaching answers to the first questions. First, the utility of future generations should be sustained. The sustainability of utility implies that the utility function of future generations has to be non-declining. Said differently, with regard to utility or happiness, the future generations should be as well off as we are now.

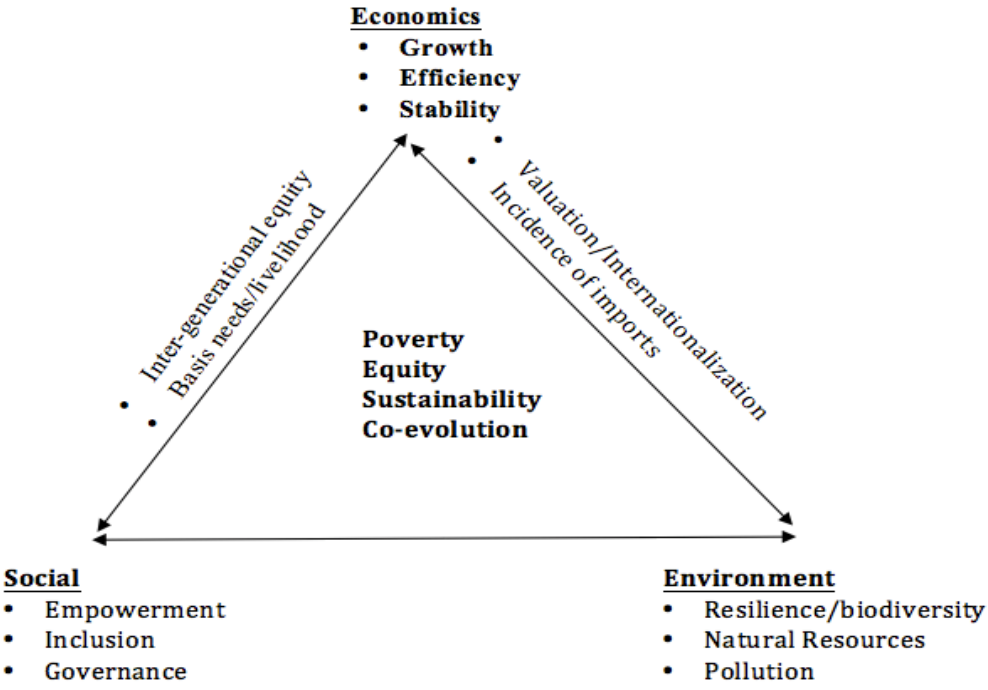
Second, according to Day (2006), in order to get sustainable development, physical throughput should be sustained. This means that the flow of physical material from the sources of nature to the economic system and back from the economy to nature' sinks should be non-decreasing. This form of sustainability implies that the well off of future generations in terms of having access to biophysical sources supplied by the ecosystem should not be less than the level we have in present.

The concept of sustainable development is considered as the main pathway to achieve human development requirements and economic growth while protecting the earth's life support systems. The concept of sustainable development has received growing consensus and has helped to formulate and present important objectives of international and regional corporations (Pan and Li, 2016).

The sustainable development concept has evolved over time by interacting three major points of view: economic, social, and environment. The interactions between these viewpoints are presented in Figure 1. Each of the viewpoints has a distinct system, which has its own domain, well-defined objectives, and driving factors. The economic system focuses on important human welfare and well-being mainly through increasing the consumption of goods and services.

The social system has objectives to enrich human relationships, enhance individual and group appreciations, and strength norms, values, and institutional setups. World leaders and policymakers have accepted the concept and goals of sustainable development, particularly, after the 1992 Earth Summit in Rio de Janeiro and the adoption of the United Nation's Agenda 21 (UN, 1993). Current production setups of different businesses are concerned with fossil fuels and mineral resources like metals, phosphates, fertilizers, and rare gases, etc. These natural resources are not considered renewable. Therefore, sustainable development is supposed to have an integrated growth concept.

Figure 1: Sustainable development triangle supported by a trans-disciplinary framework



Source: *Adapted from Munasinghe (1992, 1994).*

Although the global emissions of carbon dioxide have increased by over 50% during the period from 1990 to 2012 (MDGs, 2015), significant progress has been made in several areas within

the framework of sustainable development concept across the globe. One of the important and most significant step in this regard is the adoption of the 2030 Agenda for sustainable development with if sustainable development goals (SDGs) by world leaders at the UN sustainable development summit in September 2015.

The Paris conference on climate change was considered as the first step for showing political will and for implementing the 2030 Agenda for achieving sustainable development. The Europe 2020 strategy: a study for smart, sustainable, and inclusive growth (Communication, EU Action plan, 2015) presented many EU strategic plans and politics in order to achieve sustainable development. According to the Europe 2020 strategy, enhancing knowledge and doing more innovations would help achieve small, sustainable, and inclusive growth keeping in mind the environmental issues as well.

Sustainability concerns that are closely linked with the concept and goal of sustainable development have recently gained importance on the agenda of policymakers, business consultants, and corporate companies across the world. The sustainability term has its origin in the French verb "Soutmir – to holdup and support" (Brown et al., 1987; Geissdoerfor, 2017). However, the modern concept of term sustainability originates in forestry – the harvested volume of wood should be less than the amount that grows again during a specific period of time (Carlwrtz, 1713). In the context of ecology, sustainability is referred the ability of nature to regenerate itself (Dudin, 2015) and being "able to maintained at a certain rate or level" (Dictionary, 2010) developed.

Conceptually, a sustainable development framework is based on two questions. The first question is related to the intergenerational allocation of resources considered for sustainability. In this regard, Solow (1993) recommends that we maintain a generalized capacity to produce economic well-being. The second question is focused on the feasibility of sustainable development. This feasibility is highly associated with the sustainability of natural capital and man-made capital concerned with production. The degree of sustainability is linked to strong and weak sustainability. Strong sustainability refers to the environmental assets and man-made capital are considered a complementary part of production and further to focus on the preservation of natural assets. In this regard, Anderson (2007) highlighted the importance of renewable resources as like money in the bank, which can be preserved as capital amount in the bank for future generation but can be consumed only certain income derived from this capital amount. This strong sustainability is not possible to apply to the depletable resources. On the other hand, weak sustainability provides a flexible solution with the belief that natural

capital can be partially substituted with the focus of the least utilization of natural resources and applying more man-made capital on the production setups.

In achieving sustainable development, the world is facing several challenges and issues. In general, these challenges include lake of stability and harmony in policies and strategies of different nations, lack of implementations of programs and methods fit to the local context, lack of political will and governance for transforming the existing economic system to the one which is sustainable in the long run, and lack of financial recourses for switching from the prevailing production techniques to more innovative and sophisticated methods required to achieve sustainable development. In addition to this, deteriorating environmental conditions, increasing income disparities, growing hunger and malnourishment, mounting urbanization, and rising energy needs are the major hindrances in slowing down the process of sustainable development. Finally, strategic assessment, mitigating measures, top-down approach, and the sustainability of natural resources are at the core to enhance the process of sustainable development and growth.

3. Green Economy

Green economy is an emerging concept and the "London Environmental Economics Centre (LEEC)" introduced this concept first time in 1989 (Pearce et al., 1989). The major attention was given to this concept after the occurrence of the global financial crisis of 2007-2008. World leaders, policymakers, academicians, business firms, consultants, practitioners, and other stakeholders have started to think and consider the concept of GE is one of the most suited, appropriate and practical solutions to economic, social, and environmental issues of the current era. It is evident that major financial, corporate, and market failures were happened due to unclear paradigm and boundaries of sustainable development pathways.

Current practices of different corporate organizations do not confront the three major challenges of social, economic, and environment. Researchers have also considered GE as an effective tool to address and mitigate the likelihood of the occurring of financial and turmoil such as the 2007-2008 financial crises. Scholars have also linked the concept of CE with the sustainable development goals. During the past few years, the emergence of partnerships, coalitions, and several new alliances have occurred to find new pathways to get higher sustainable economic development and growth without deteriorating the quality of the environment and depleting nature's resources.

The two themes of the 2012 United Nations Conference on Sustainable Development (Rio+20) are directly related to the GE concept. This link has substantially provided the catalyst for collaborative academic and non-academic research, consultations, and new syndicates that have led to produce a huge volume of literature on the concept of GE. After the Rio+20, the UN Division for Sustainable Development has published a series of guidebooks containing a wide range of principles of and guidelines on the GE. These principles and guidelines have helped researchers, policymakers, and practitioners not only to understand, define, and conceptualize the concept of GE but also to relate it with other several concepts such as green growth and low-carbon development.

These guidebooks have published several principles for GE. Some of the most important principles include the delivery of sustainable development, the establishment of equity and justice, the improvement of earth integrity, provision of economic, and social, and environmental resilience, the assurance of sustainable consumption-production patterns, the reduction of gender inequality, and the definition of well-being in new dimensions (GEC, 2012; SFBEC, 2012). Similarly, ICC (2011) has defined different conditions for the adoption to and the transformation of the existing economy towards the GE, including economic innovations, social innovations, and environmental innovations. Some of the selected principles of GE are given in Table 1.

Like the other two concepts: CE and SD, one of the major challenges and barriers in the practical implementation of the GE concept is substantial variations in the conceptualizations of the concept among the scholars, policymakers, and practitioners across the globe. Another major issue concerning the concept of GE is the lack of practical integrated frameworks. The existing literature has defined GE in several different ways. Nevertheless, the main features of GE include sustainable development, conservation of nature's resources (e.g., water, land, forests), biodiversity, green growth, recycling, eco-efficiency, renewable energies, green technology, territorial resilience, green jobs, and the reduction in product lifecycle.

These issues highlight the transitional requirements of sustainable development based upon several practical reasons that restrict sustainable development practices. In this regard, the first major reason is concerned with the lack of interest and significant failures in contributing design of clear policies of focusing on environmental and sustainable issues. These expected initiatives to invest in the environment have a significant positive impact on the economic well-being of the organizations and society. These initiatives and transitional requirements demand convincing practitioners consider it economically beneficial for the businesses. These benefits are associated with job creation, innovative market niches, rise in output, and trade of the

businesses and finally have a positive impact on the GDP growth. In this concern, it is necessary to create clear linkages and relationships between socioeconomic, environment and sustainable development. These linkages should be aligned in such a way that these practices contribute positively to the human welfare and creation of a well-designed sustainable development strategy to the ultimate purpose of poverty alleviation. According to the United National Environment Programme (UNEP) (2011), "[GE] results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a GE can be thought of as one [of the economic system] which is [yields] low carbon, resource-efficient, and socially inclusive."

In this regard, the concept of GE is the radical approach of emphasizing on these linkages. This concept is also a useful tool in the facilitation of raising transitional requirements and bringing changes in sustainable development. The UNEP also defines the GE as "The [GE] is one in which the vital linkages among the economy, society, and environment are taken into account and in which the transformation of production processes, and consumption patterns, while contributing to a reduced waste, pollution, and the efficient use of resources, materials, and energy, will revitalize and diversify economies, create decent employment opportunities, promote sustainable trade, reduce poverty, and improve equity and income distribution."

A common theme emerged from these definitions is that GE provides effective and practical nature-based solutions to the socio-economic problems faced by the economy and society. Within the framework of GE, the ecosystem provides different types of natural assets such as natural capital (land, water, air, geology, and all living creatures on this planet) that deliver several fundamentals benefits for the economy and society. Nonetheless, these benefits are often concealed and ignored by business firms and other stakeholders (D'Amato et al., 2017). The practical strategies, business models of and long-term investments on GE activities will help in achieving a faster growth rate of the economy. The policies favoring GE will minimize environmental degradation and reduce the adverse influences of energy supply shocks, scarcity of water and clean air, and depletion of natural assets (Young and Tilley, 2006). Similarly, the investments in GE will expand the job opportunity set by enhancing the productivity of the agriculture sector, which, in turn, result in a reduction in inequalities and poverty. Further, investing in the green economy will also increase the productivity and efficiency of the manufacturing sector by bringing new, more sophisticated, and more cost-effective technologies in the production process.

The concept of GE is fundamentally based on the concepts of resources-efficiency and renewables (Korhonen and Seager, 2008; Franceschini and Pansera, 2015). However, it primarily brings a higher green growth in the economy by providing solutions based on nature. Further, it enhances the economic and social well-being of the different segments of the society by stimulating the process of restoration, conservations of recourses, and sustainability of nature's assets, mainly through enhancing social inclusions. GE is more a holistic concept, which considers more aspects of social dimensions such as eco-tourism, education, and eco-enterprises mostly at regional levels. As in D'Amato et al. (2017), GE is one of the narratives that particularly related to the idea of social justice and public inclusivity, which are the two fundamental aspects of sustainable development.

Table 1: Green Economy Principles

Type	Principles
Economics	✓ Identify natural capital and values
	✓ Economic development and integration of this with growth models
	✓ Internalizes externalities
	✓ Promotion of practices concerned with resource and energy-efficient
	✓ Generation of sophisticated work opportunities and green jobs
Environmental	※ Safety measures of maintaining biodiversity and ecosystems
	※ Invest in and sustain natural capital
	※ Identification and give attention to the planetary boundaries and ecological limits
	※ Approaching higher global environmental sustainability goals.
Social	⁂ Produce results of poverty alleviations, well-being, livelihoods, social equity and access to basic and necessary services
	⁂ Is socially inclusive, democratic, participatory, accountable, transparent and stable
	⁂ Is equitable, fair and just-between and within local boundaries and among different generation.

Source: Drawn from the literature.

4. Circular Economy

As it is described in the above section, nowadays, the concept of sustainable development is on the main item on the agendas of policymakers across the globe. In recent years, it is evident that governments and other stakeholders are exploring for the efficient ways to address climate change and other environmental issues as well as other social and economic problems

(Aggesund, 2018). Most importantly, one solution that has gained a lot of attention in recent years is to execute and facilitate a transition of society and the existing linear economic system to a circular economy. In recent years the concept of CE is trending among institutions, scholars, practitioners, and firms (Kirchherr et al., 2017; Ghisellini et al., 2016). The term CE was coined by Pearce and Turner (1990) in which they highlighted the interconnection between the environment and economic activities and identified a closed-loop material flow in which the economic system takes place which stands on an assumption of "everything is an input to everything else" (Su et al., 2013). Yet, the CE principles trace back to the work of Boulding (1966). In his seminal work, he introduced the concept of a closed system to identify the very limited natural resources accessible for human activities.

Relating to industrial economics, Stahel and Reday (1976) have highlighted some essential characteristics of the circular economy. Specifically, the authors presented the idea of a loop economic system to explain the strategies of industrial sector in order to prevent waste, create more employment opportunities, increase resource efficiency, and dematerialize the industrial activities. In another study, Stahel (1982) introduced the concept of providing goods at rent for utilization purposes rather than the transfer of ownership as the most sustainable business for a loop economy. In this way, different industries can make profits without taking into account externalizing costs, particularly social and environmental costs related to products' manufacture and utilization, and risks associated with waste.

The current understanding of the concept of circular economy, its theoretical framework, and practical strategies, and the associated business models has progressed various characteristics and influences from a wide range of ideas that are based on the concept of closed loops. Indeed, according to the existing literature, the definition of CE is not static and accommodates a wide range of principles and applications that have been devised in the last decades. Among several others, some of the most important and appropriate theoretical advancements are "regenerative design" (Lyle, 1994), "performance economy" (Stahel, 2008), "cradle-to-cradle" (MecDonough and Braungart, 2002; Braungart et al., 2007) and "industrial ecology" (Erkman, 1997).

From the pertinent literature, it is also clear that CE was initially conceptualized in view that economic growth leads to environmental degradation, over usage of natural resources and decline in biosphere reproductive capacity (Lieder and Rashid, 2016). Therefore, starting from these assumptions, CE emphasizes the necessity to re-design the traditional "take-make-dispose" linear path of production and consumption (Geng and Doberstein, 2008). Still among the researchers, there is no consensus over the definition of CE (Rizos et al., 2017), and this

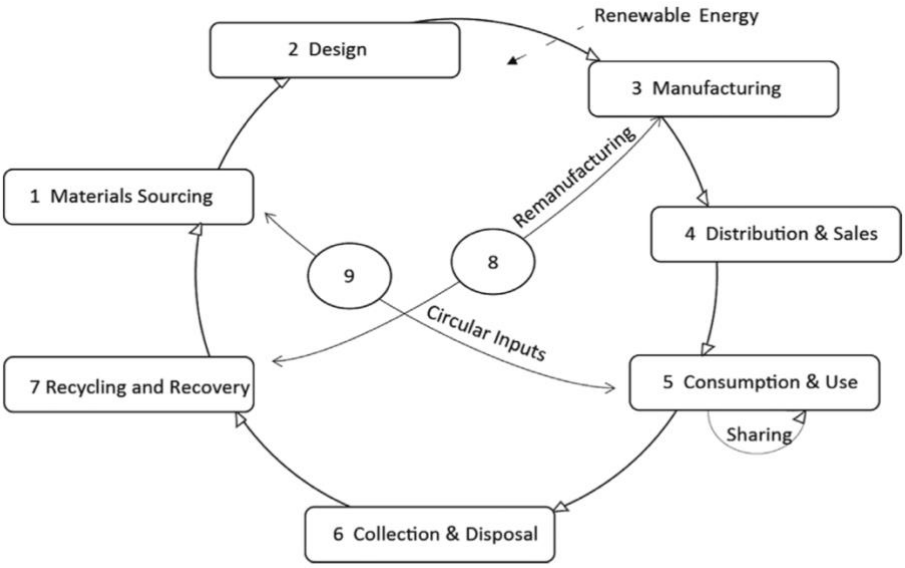
may generate confusion (Preston, 2012). On one side, the lack of standard definition leads CE to a conceptual deadlock (Kirchherr et al., 2017), on the other side, it is argued that a narrow definition is inappropriate for a concept which aims at setting up a new socio-economic paradigm (Masi et al., 2017).

The most useful definition of circular economy is "[CE] an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models." (Ellen MacArthur Foundation, 2012; Schut et al., 2015; Geissdoerfer et al., 2017). Some selected definitions of CE are given in Table 2.

Also in academia, there is no consensus over its definition (Rizos et al., 2017), and this may create some doubt (Preston, 2012). The reason is that CE is a relatively young field of research, with roots in different disciplines and schools of thought (Blomsma and Brennan, 2017; Bocken et al., 2017). However, if, on one hand, this lack of common and shared definition could lead CE to a conceptual deadlock (Kirchherr et al., 2017), on the other hand, it might be argued that a narrow definition is not suited for a concept which aims at establishing a new socio-economic paradigm (Masi et al., 2017).

The circular economy is based upon the principles of the spiral loop system (European Commission, 2015). The basic motive of CE is to keep utilizing products rather than waste them. Therefore, CE is also functionalized four R-strategies i.e. repair, reuse, recondition, and recycle. The circular economy has a unique value chain given in Figure 2 below. The circular economy is not a new concept. It is linked with different notions of previous studies like spaceman economy (Boulding, 1966), limits to growth (Meadows et al., 1972), the steady-state economy (Daly, 2006), performance economy (Stahel, 2010), industrial ecology (Graedel and Allenby, 1995; Frosch and Gallopoulos, 1989) and the cradle-to-cradle (McDonough et al., 2003; Stahel and Reday-Mulvey, 1981).

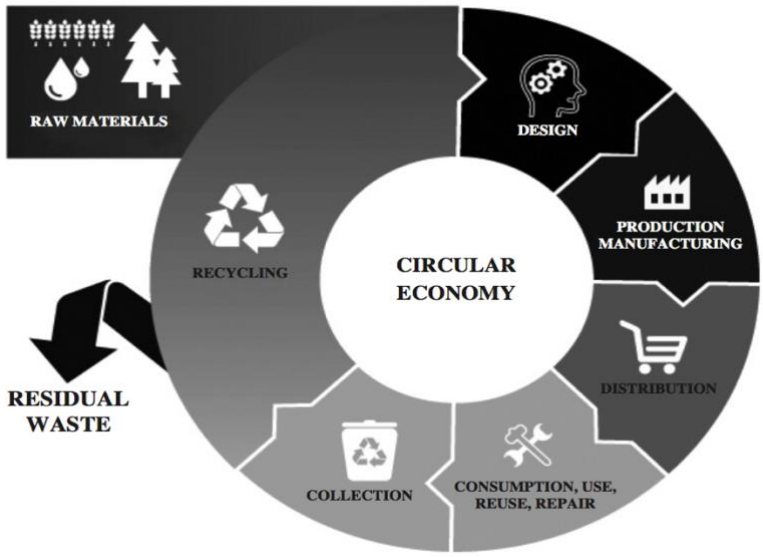
Figure 2: Resource Flow-through Value Chain in Circular Economy



Source: Adapted from Kalmykova et al. (2018).

In the notion of the circular economy, the 4-R strategies approach is further enhanced to a more generalized framework as given in Figure 3. This model is based on eco-design, repair, reuse, refurbishment, remanufacture, product sharing, waste prevention, and waste recycling.

Figure 3: Circular Economy

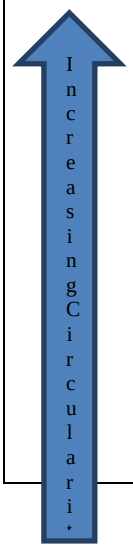


Source: Adapted from European Commission.

In principle, the depletion of non-renewable resources is followed by persistent biological, economical, and social impact, and an un-reflected utilization of natural resources leaves incredible footprints (Stahel, 1982) motivated by the consumption for long has been believed a symbol of happiness and prosperity. Moving towards a more sustainable economic system, that is, CE, and to gradually overcome the dependence on the product lifecycles is the need of the day. The proponents of CE are of the view that in order to optimize the natural resource usage one should keep materials available rather than disposing of them as a result closing the loop of materials within the lifecycle. Further, the growth in an economy with a circular logic cannot be realized with the production of more and more products, rather keep these existing resources available for an extended time period, for example by appropriate maintenance of natural resources instead of their replacement (Amui, 2017). Up till now, CE has been utilized rarely and only fragmentally (Kirchherr et al., 2017).

The transformation towards more CE endeavors to decouple economic growth from the depletion of natural resources and environmental degradation (Murray et al., 2017). Therefore, at present, CE has been recognized as a guiding tool to design the economic policies in many countries (George et al., 2015). The circular economy is recommended as an approach to economic growth that is in line with sustainable environmental and economic development (MacArthur, 2013). Table 2 presents the process of the transformation of the linear economy to the circular one.

Table 2: Transformation: Linear to Circular Economy

		Strategies	**Description**
Circular Economy 	Smarter product use and manufacture	R0: Refuse	Make product redundant by abandoning its function or by offering the same function with radically different products.
		R1: Rethink	Make the product more intensive (by sharing product).
		R2: Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials.
	Extend lifespan of the product and its parts	R3: Reuse	Reuse by another consumer of discarded product which is still in good condition and fulfills its original function.
		R4: Repair	Repair and maintenance of defective product so it can be used with its original function.
		R5: Refurbish	Restore an old product and bring it up to date.

Linear Economy		R6: Remanufacture	Use parts of discarded products in a new product with the same function.
		R7: Repurpose	Use parts of discarded products in a new product with a different function.
	Useful application of materials	R8: Recycle	Process materials to obtain the same (high-grade) or lower (low-grade) quality.
		R9: Recover	Incineration of material with energy recovery.

CE and Business Models

Moving towards CE and desire sustainability-driven business models require a fundamental shift that runs through the organization and its stakeholders. This fundamental shift is obliviously disruptive in nature, which essentially requires new procedures and solutions to modify the current ways of working. This whole transition strongly depends on the capability and resilience of the organizations to cope with this advancement, an elementary need that is usually mentioned for firms, in general, to contribute to sustainable development (Boons and Lüdeke-Freund, 2013; Van de Ven, 1986). In this regard, it is very crucial for organizations to find new and productive ways of working to handle this disruptive change.

The understanding the dynamics of the existing barriers in the industry is vital in many aspects such as in order to define the direction for future research, for environment preservation, and to support the organizations to move towards sustainable CE smoothly. Therefore, the study in hand intends to examine CE, EP, and sustainable development. It is a common phenomenon that the assimilation of sustainability issues and recent development in business is very important for our society (Lieder and Rashid, 2016; Holton et al., 2010). In the literature, it is very clear that CE can be economically viable (Liu and Bai, 2014), and it is indeed a required model, which combines both sustainability and business. In addition to that CE is coping with three challenges: resource shortage, environmental impact, and simultaneously increasing economic benefits (Holton et al., 2010). To sum up, transforming from a linear economy to CE is a more complex procedure as material and energy, product design, business models, manufacturing, service and distribution processes, and data management have to be considered (Kirchherr et al., 2017).

As the literature suggests that the CE based on the principle of the "spiral loop system". The philosophy behind the underlying principle is to maintain products in use and not disposing of them, which then involves the use of the famous four R-strategies, which are (i) repair (ii) reuse (iii) recondition and (iv) recycle. A deliberate intention behind these strategies is that the product-producing firm would keep the responsibility for the product and apply these strategies during the operations. As a result, firms should have to consider how their business and methods are altered accordingly.

In order to more systematically investigate barriers in practice, the literature has specifically been studied regarding barriers and a few sources also suggest a categorization of barriers to CE transformation for companies (see, for instance, Kok, 2013; Shi et al., 2008). In Table 3, we presented the barriers and their categorizations (for more extensive studies on CE barriers, see, Kvale, 1994). The literature has identified the huge number of barriers and they are typically connected to each other and undoubtedly demonstrate the complexity of CE and what is required for a transition, which is both multi-dimensional and multi-domain. Some overall challenges associated with the implementation of the CE concept are given in Table 4.

Table 3: Barriers for Moving towards Circular Economy

Financial	Measuring the financial benefits of a circular economy
	Financial profitability
Structural	Missing exchange of information
	Unclear responsibility distribution
Operational	Infrastructure/ Supply chain management
Attitudinal	Perception of sustainability
	Risk aversion
Technological	Product design
	Integration into production processes

Table 4: Challenges of Circular Economy

1. Problematic ownership structure
2. Lack of understanding/awareness
3. Underestimation of associated benefits
4. Deregulated markets
5. Poor governance
6. Lack of political will
7. Existing technology and production methods
8. Financial constraints
9. Slow cash flow steams

***Source**: Authors' own construction.*

5. Interconnections between Circular Economy, Green Economy, and Sustainability

To achieve long-term economic, social, and environmental sustainability, it is necessary to understand commonalities and similarities between the concepts of CE, GE, and SD, on one hand, whereas, on the other hand, there is a need to highlight the theoretical, conceptual, and practical distinctions between the three concepts. Knowing the synergies between targets, objectives, and requirements for the practical implementations of CE, GE, SD is critical for world leaders, policymakers, practitioners, social and environmental activists, NGOs, consulting firms, businesses, international agencies and donors, and the academicians to harvest the maximum benefits associated with these concepts. Symmetry and synchronized approach, which is only possible when commonalities between these three concepts are identified, will help local communities, domestic firms, multinational companies, and countries across the globe to the simultaneous achievements of the goals of CE, GE, and SD. Table 5 presents some common potential economic, social, and environmental benefits associated with all three concepts.

Table 5: Potential Benefits of CE, GE, and SD

Economic Benefits	Social Benefits	Environmental Benefits
• Cost reduction • Increased productivity • New jobs • Higher profits • Diffusion of technology • Value addition • Low inequality • Internalizing externalities • Less market disturbances • Increased financial and economic stability • Fast, persistent, and green growth	• Inter and intra-generational equity • Poverty alleviation • Fair taxation • Circularity of resources • Social inclusivity • Social linkages • Social justice • Socio-efficiency • Better working condition • Less social vulnerability • Narrowing inequalities	• Less resource depletion • Less biodiversity loss • Less water, air, and soil pollution • Less land use • Less waste and emissions • Less use of material and energy input • Less environmental degradation

Source: *Authors' own construction.*

Currently, corporations are focusing on “eco-innovations, eco-efficiency, and corporate social responsibility (CRS)” to achieve corporate sustainability targets (Bocken et al., 2014). However, there is a need to do much more by making the holistic changes in the vision, targets, production methods, and practical strategies to implement the concepts of CE, GE, and SD in a comprehensive manner. The governments, corporate companies, and private firms should be focused on eco- and socio-effectiveness to attain sufficiency and ecological balance in the framework of long-term sustainability. The reconciliation of the interlinkages between these concepts helps in understanding the economic, social, and environmental objectives and goals that are now the main item on the agenda of policymakers and businesses across the globe.

Both CE and SD highly emphasize on the economic and environmental aspects of sustainability. Unlike the conventional linear economic system, which is the model of production and exchange based on the take-make-waste mechanism, CE stands upon the closed-loop system, which is characterized by make, use, reuse, remake, and recycle. These characteristics of CE will result in economic activities and the increased efficiencies by reducing externalities. Further, CE will result in higher sustainability of production and consumption patterns by encouraging all the governments and businesses to focus on eco-innovations, long-lasting design, and refurbishing and recycling of resources. It also stresses on value addition and cost-effectiveness, which, in turn, result in higher profits, by advocating the reduction in the use of virgin materials and energy inputs in the production processes. The third concept, GE, is also highly integrated with the concept of long-term sustainable production-consumption patterns. It promotes the growth of the economy taking into account the people-plants-profit concept. GE is mainly rooted in the concepts of resources-efficiency and renewable (Korhonen and Seager, 2008; Franceschini and Pansera, 2015). It brings a higher green growth in the economy by providing solutions based on nature. Further, it enhances the economic development of the different segments of the society by stimulating the process of restoration, conservations of recourses, and sustainability of nature's assets, mainly through enhancing social inclusions.

The SD framework emphasizes on maintaining the stock of assets, definitely for future generations, while optimizing the flow of production, distribution, income, and consumption. From the SD viewpoint, eco-efficiency plays a vital role in achieving the efficient allocation of recourses in production and ensuring optimal and efficient consumption decisions that are necessary conditions for maximization of utility. In this context, SD ensures sustainable production-consumption patterns by focusing on efficiency, stability, and growth aspects of the

economy. Thus, in terms of high economic growth and sustainability, both CE and SD supplement each other.

Another important zone in which both CE and SD combat is the preservation of the environment. The idea of SD is highly linked with climate change intensity, system vulnerability, and system resilience. Changes in temperature, levels of sea, rainfall intensity, duration and frequency, and precipitation may adversely affect ecological, biological, and social and cultural systems. The proponents of SD propagate the three possible solutions for reducing environmental changes vulnerability, namely adaptive capacity, mitigative capacity, and resilience (Munasinghe, 2002; IPCC, 2001). Within the framework of SD, natural resources preservation, less air, water, soil pollution, and less biodiversity are essential for attaining higher and persistent economic growth by taking into account environmental sustainability.

Likewise, the concept of CE is highly aligned with the preservation of the environment. The models of CE are characterized by less use of virgin nature's capital, more dependence on renewable energy, reductions in wastes and emissions, higher durability of products, focusing on recycling, refurbishing, and remanufacturing, and reductions in waste disposal. Circular economic activities help product environment degradation by promoting the concept of eco-effectiveness (Braungart et al., 2007; EMAF, 2013) and the industrial ecology (Graedel, 1996; Frosch and Gallopoulos, 1989). Under the framework of CE, eco-effectiveness, natural systemic, and economic systems are coupled into a single economic system, which entirely depends on renewable energy sources and recycling of all the raw materials used in the productions. The concept of CE stresses on new business models, market models, and product designs based on non-waste technology, limited waste, produce less harmful emissions and rely more on renewable energies. Similarly, the CE concept encourages and motivates private and corporate firms to invest in eco-design of the products and to adopt clean production methods, which will result in less greenhouse gasses. Thus, form the environmental point of view, both CE and SD concepts give great attention to environmental preservation while focusing on fast and sustainable growth of the economy, are highly interlinked with each other, and can be considered as complements. Like both SD and CE, GE is more confined to environmental preservations, specifically land and other nature's assets (D'Amato et al., 2019). In the context of environmental protections, GE primarily emphasizes safety measures for maintaining biodiversity and ecosystems, investing in sustain natural capital, and achieving higher global environmental sustainability goals. Further, it gives an unusual type of attention to the planetary boundaries and ecological limits.

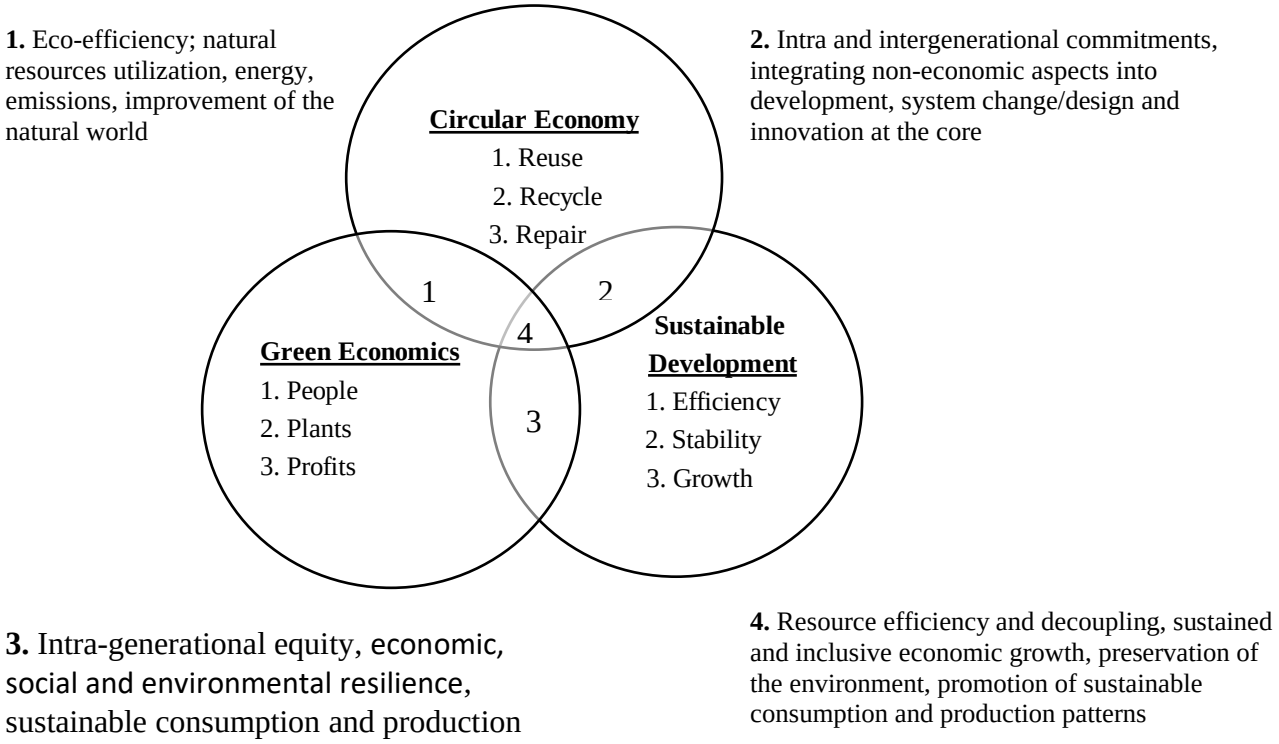
Concerning the well-being of the society, social security and sustainability are considered an integral part of the SD concept. In particular, the SD framework emphasizes strategies and policies for higher sustainable growth by focusing on empowerment, public inclusion, and good governance. It suggests the need for strengthened values and institutions for economic growth. Further, it also highlights the need for a holistic integration between the achievements achieved within the framework of individualism and collectivism. The SD concept triggers improving human prosperity, well-being, and welfare by increasing the consumption of goods and services. The idea of SD is deep-rooted on the concepts of equitable growth, poverty alleviation, and providing equal opportunity to all the segments of the society.

One the other hand, the CE is mainly indirectly linked to the social dimensions. The CE concept is originally grounded on holistic changes in industrial systems. Therefore, it does not accommodate sufficiently both social and regional dynamics. It is mainly based on reuse, remake, recycling, eco-innovations, durable product designs, reduce required material, and renewable energy without giving must weight to long-term social sustainability in terms of equal distribution of resources, poverty eradication, and welfare of the society. Business firms are mainly initiated CE because of legislations instead of political and academic movements (Murray et al., 2015). Furthermore, the CE concept more directly focused on minimizing the costs of productions, increasing profits, enhancing eco-efficiency, and improving existing production methods (Guenster et al., 2011). Therefore, the visions, objectives, and actions of corporate businesses are not very tightly linked with the social well-being aspects of the society within the frame of CE. On the other hand, GE is, even more, a holistic concept, which considers more aspects of social dimensions such as eco-tourism, education, and eco-enterprises mostly at regional levels. As in D'Amato et al. (2017), GE is one of the narratives that particularly related to the idea of social justice and public inclusivity, which are the two fundamental aspects of sustainable development.

Based on the discourse analysis of the interconnection between all the three concepts, the visualization of the integrated aspects of the concepts is presented in Figure 4. Both CE and GE are rooted in the ideas of eco-efficiency, resource efficiency, renewable energies, low carbon emissions, and the improvement of nature capitals. On the other hand, both CE and SD mainly focus on intra and interrogational commitments, integration of non-economic aspects into development in order to achieve sustainable production and conception patterns. Finally, both GE and SD have more common grounds with respect to social well-being and environment preservations. For instance, both of these concepts take into account intra-generational equity, economic, social and environmental resilience while suggesting practical

paradigms for attaining sustainability. It has emerged that the conceptualization, implementations, and evolution of CE, GE, and SD highly assimilates the ingredients of resource efficiency and decoupling, sustained and inclusive economic growth, preservation of environment, and promotion of sustainable consumption and production patterns.

Figure 4: Interconnections between Circular Economy, Sustainable Development, and Green Economy



Source: Authors' own construction.

6. The Role of Islamic Finance in Operationalizing Circular Economic, Green Economic, and Sustainability Models

The proponents of Islamic interest-free banking suggest that due to the inherent structural advantages attached to Islamic banking transactions over traditional banking practices, Islamic banking is a viable option to promote economic growth and is better suited to absorb macro-financial shocks. Islamic banking products and contracts are designed based on Shariah principles, which help reduce uncertainty in the financial system. Although the history of

Islamic banking goes back to just half a century, Islamic banks' assets are rapidly and persistently growing globally, even in non-Muslim countries. According to the Islamic Financial Services Industry Stability Report (IFSB), the total Islamic banking assets have surpassed USD 2 trillion in 2018. Currently, Islamic banking is present in 32 countries where they operate alongside their conventional counterparts. Out of these 32 tracked jurisdictions, Shariah-based banking is systemically important in 12 countries.[39] In these countries, Islamic banks are holding 92% of the global Islamic banking assets (IFSB, 2018).

The 2007-08 global financial collapse (hereafter GFC) and subsequent disturbances in financial markets have increased the importance of financial sector stability for financial development and economic growth. An efficient, sound, and stable financial system is essential for improving financial and economic performance of an economy. No doubt, the stability of the overall financial environment significantly depends on the stability of banks. Indeed, banking sector stability not only affects the economy by enhancing its capability to absorb internal and external financial shocks but also positively contributes to domestic financial system stability and ultimately leads to achieving global financial stability. Table 6 presents needs for finance required for circular business models.

Table 6: Need for Finance for Circular Business Models

Bank Finance	Corporate debt	Traditional corporate leading to finance circular business with guarantees at the corporate level.
	Lease	Can fit pay per use earning models. Applicable to clients that are creditworthy and products with predictable residual values in second-hand markets.
	Factoring and supply chain finance	Can solve the pre-financing issue of pay per use earning models by selling uncertain future cash flows to a financial institution.
	Structured finance	Can be a financing option for large stand-alone circular projects.
	Balance sheet reduction through off-balance finance	Can solve the issue of balance sheet extension.
Capital Markets	Equity finance: Initial Public Offering	Valuable source of finance for most large and mature circular businesses that meet the scale and requirements of the capital markets.
	Debt finance: Green bonds	

[39] These countries having a market share of more than 15% of total banking assets.

Foundations and Impact Investors		Most circular businesses are still there are still at their pilot stage, are not profitable yet or lacking a track record. Non- commercial finance can bridge the gap from the pilot stage to the growth stage as they are less concerned with being fully compensated for the financial risk.
Venture Capital, Private Equity, Family Offices		Finance source for the many startup businesses in the circular economy. However, their requirement for high growth and relatively fast payback horizons might limit suitability for circular business.
Near banks like Google, Apple, Amazon, etc.		Offer new payment facilities and possibly working capital solutions.
Crowd Funding	Peer 2 peer lending	Finance source for circular business that involves the (local) community or those based upon ideas that appeal to the crowd.
	Equity investment	

Source: *Adopted from the literature.*

Islamic banking due to linkages with the real economy helps reduce the uncertainty in the financial system. Apart from its popularity among Muslims because of the consistency of Islamic banking products with their religious beliefs, Islamic banking is also adopted by non-Muslims. Undoubtedly, it is currently the fastest-growing banking industry. According to IFSB, the total Islamic banking assets increased to USD 1.5 trillion in 2017. Shariah-based banking is present in 31 countries having a dual financial system, and the number of jurisdictions where Islamic banking is systemically important (market share of more than 15% of total banking assets) increased to 12. About 88% of the Islamic banking assets are held in these 12 countries (IFSB, 2017).

In 2000, MDGs were set to protect the path of development and prosperity of future generations by the end of 2015. However, with the consensus of all nations, MDGs were replaced with an updated version of SDGs at the beginning of 2015. SDGs state 'the needs of the present generation without compromising the ability of future generations to meet their own needs' (WCED, 1987). There are three main directions that need to be focused to achieve this high vision: economic growth, social inclusion, and environmental protection. Until now, the role

of Islamic finance has been very important in the first two dimensions. Specifically, Table 5 presents the needs for finance for a circular economy. Islamic finance has submitted considerable growth over the globe during the current decade. By 2017, the industry of Islamic finance showed a rapid growth of 11% to US$ 2.4 trillion in assets or by compound annual growth rate (CAGR) growth of 6% from 2012. It was also predicted that the industry of Islamic finance might achieve the target of US$ 3.8 trillion in assets by 2023 with an expected growth of 10% per year (IFDI, 2018). Though growth is significant, it is not the only factor realization rather social goals are equally important (Sadiq and Mushtaq, 2015).

6.1 Financial Sector Stability and Resilience

The stability of the financial sector is a prerequisite for achieving economic growth. During the current decade, the global financial crisis of 2007-08 has adversely affected the real output of economies and their welfare for a long time that economies could not yet come out of those adverse effects (BIS, 2008). Out of several reasons, a high level of public (Mian and Sufi, 2015), private, and household debt was the main causes of lower economic growth (Cecchetti et al., 2011; Arcand et al., 2012). All financial tools related to speculation like collateralized debt, credit default swap, and mortgage-backed securities, reached the value of $596 trillion in 2007. LiPuma and Lee (2005) had apprised that the size of the derivatives market was mounting to almost ten times the global economy. They found that speculative debt financing along with derivatives was unconnected to the strong real asset base. Therefore, they warned that horrible consequences might be faced by the global economy. Such risk exposure may cause losses many times of the original investment (Rime, 2001) and financial crisis of 2007-08 proved it to be true. The best remedy to avoid such financial instability is to enhance the volume of equity financing to debt (Taleb and Mark, 2009; Buiter et al., 2015).

Islamic banking industry (IBI) is distinguished from conventional banking by the fact that IBI is associated with real assets (Ayub, 2007). Islam has blocked all possible trails of illegal transactions by announcing the prohibition of interest, gambling, and *gharar* (uncertainty) (Khan, 2009) such as speculation, which is equally referred to as *gambling* (Aziz and Gintzburger, 2009). These are the Shariah principles, which connect the Islamic financial sector to the real economy and interdict the debt-based financing. Consequently, they reduce the probability of financial crisis and enhance the surety of the financial system. Therefore, most of the IFIs remained unaffected during the 2007-08 financial crisis (Hasan and Dridi, 2011). Different comparison studies submitted that IFIs performed better as compare their

conventional counterparts (Demirgüç-Kunt and Huizinga, 1998; Hassan and Bashir, 2003; Abdulle and Kassim, 2012; Beck et al., 2013; Arman and Ahmed, 2017; Bitar et al., 2018; Salman and Nawaz, 2018).

Islamic banks and IFIs contribute to the stability of the financial system through their equity-based financing which lessens the exposure to systemic risks and paves the way toward overall stability (Taleb and Mark, 2009). Equity-based financing gradually expanded and brought non-banking financial institutions under its umbrella like *mudarbah* companies through *Modaraba* Companies and *Modaraba* (Floatation and Control) Ordinance, 1980 (Khan, 1996). Equity-based financing is a vast area with several opportunities, but the association of professionals who truly understand both the financial risk and business risk involved in equity financing is limited (Sadiq and Mushtaq, 2015).

6.2 Inclusive Finance

A fair distribution of finance and sustainable development are prerequisites for uplifting the status of the Muslim world which is ranked by now among the poorest nations in the world (Obaidullah and Khan, 2008). The availability of financial services to the poor is amongst the best opportunities to elevate them out of extreme poverty and hunger (FSP, 2010). Unfortunately, this destitute part of the world population is deprived of availing the conventional financial services. Various researchers found that round about 72% of the Muslims in the world do not seek financial services, 20 to 40 percent of which avoid them because of the involvement of interest (*riba*) (Karim et al., 2008), while for the majority these services are out of reach. Therefore, access to finance to the poor in the Muslim world would require providing Shariah-compliant financial service (Ahmed, 2013) and it would play a progressive role in eradicating poverty (Askari et al., 2015).

Shariah-compliant microfinancing would be the best form of inclusive finance at both geographical and religious levels. The involvement of higher risks is an impediment to conventional financial organizations from inclusive financing. On the contrary, IFIs can play their role in establishing sustainable opportunities for inclusive finance (Karim et al., 2008). Researchers have submitted that effective inclusive finance is subject to the microfinance facility at different levels, for maximum outreach. Available market data already establishes that IFIs are a better vehicle for inclusive finance as compared to its conventional counterpart (Ahmed, 2009).

MFIs finance the poorest segment of society who usually possess the least to lose and having a high probability of suffering losses. Finally, investors become suspicious and hesitate to deposit their money with MFIs along with such high risks. Alternatively, the capital market can be benefited to issue securities to raise funds, which can then be utilized for microfinance purposes (Easton, 2005). Bangladesh Rural Advancement Committee (BRAC) issued a zero-coupon tax bond and raised $90 million in 2007 to finance its microfinance operations (Rennison, 2007). The capital market is yet untouched source of fundraising for IMFIs (Ahmed and Mohieldin, 2015). It is only the Indonesian government that remained successful in its issuance of retail Sukuk in 2014 (Ho, 2014).

To raise their funds, Islamic microfinance institutions (IMFIs) by regulatory restrictions cannot accept deposits and moreover, it would narrow down their operational scales (Ahmed and Mohieldin, 2015). Zakah, Waqf, and other charitable funds are a potential source of funding for IMFIs to finance their operations (Dusa and Thaker, 2016; Thaker, 2018). IMFIs can rapidly achieve the objective of outreach and sustainability if Zakah, Waqf, and other charitable sources are integrated with them (Ahmed, 2002), because IMFIs will not face risks that would affect their fund sources.

6.3 Reducing Vulnerability of the Poor and Mitigating Risk

On the contrary to conventional finance, Islamic finance possesses a unique quality of having risk-sharing rather than having only risk transferring. Moreover, the concept of takaful, a risk-mitigating tool, increases the level of investor's satisfaction. They provide micro takaful to the poor segment of the society (Ahmed, 2013). Another approach of strengthening the poor is Zakah and Waqf, which would be very influential sources for IMFIs in reducing the weakness and upgrading the adaptability of the poor. In classical times of Islam, Zakah and Waqf remained effective and efficient institutions in taking care of the poor segment of the Muslim world (Kahf, 2004; Sherazi et al., 2015). Researchers also suggested the interest-free credit approach, which is also named as *Qard Hassan* approach to the weak part of the society. Its practical implementation in the agriculture sector, named *Diwan al-Zakah*, remained successful in Sudan (Kahf, 2004). Scholars also suggested that the problem of the miserability of the poor could be addressed through another persuasive approach, which is the utilization of Zakah and Waqf assets to pay their monthly takaful premium to secure them against some characterized risks (Sadiq and Mushtaq, 2015). Sherazi et al. (2015) suggested a new approach integrated with Waqf that Sukuk can be issued on the back of Waqf owned assets and raised funds to be used in microfinancing projects. They also proposed that IMFIs may develop their own waqf

funds and they can raise funds by issuing their own Waqf certificates. It will gain strength in the long-run period.

6.4 Contribution to Environmental and Social Issues

Cleanliness is considered 50 percent of the *iman* (faith) (Muslim, 261H) in Islam that shows how environmental and social protection is most important matter in the eye of Shariah. All earth's resources are available to the humans are in the capacity of the vicegerent of Almighty Allah (Al-Quran, 2: 30). Consequently, they are not allowed to waste or misuse of the resources, which guarantee the protection of life in all aspects. Riham (2014) stated that Islam is a friendly religion for ecological balance and advocates that the well-being of future generations should not be compromised. Therefore, Kula (2014) submitted that Islam is an environment-friendly religion.

However, a bunch of studies described that the role of Islamic finance intending to environmental and social objectives is either little and negligible or nonexistent (Sadiq and Mushtaq, 2015). Maali et al. (2006) conducted a study of social reporting of twenty-nine banks and found satisfactory results reading benevolent activities and employee-related issues, but there was no record of even single activity regarding the betterment of environment in their reports. Haniffa and Hudaib (2007) found that the Islamic bank's dedication toward social betterment got a low score. Kamla and Rammal (2013) reviewed the social reporting of nineteen Islamic banks and found that there was no role of Islamic banks in social improvement. They neither found any policy regarding the destitute part of the society nor in the fair redistribution of wealth. While explaining the reasons for such findings, they said that Islamic banks failed to make social equity a priority in their operations. Consequently, Islamic banks remained fail to achieve their ideological objectives.

According to Obaidullah (2018), Islamic finance is more suitable and friendly for the objectives of environmental protection and sustainability to boost the overall welfare of the society. SDGs and the goals of planet fortification, the protection of the environment, climate management, and adaptation are clearly compatible with and supportive of the high objectives of Shariah. Islamic Green Fund (Obaidullah, 2018), and Islamic Green Sukuk (Zervos, 2018) can play an important positive role in the agenda of climate change. Islamic development bank (IDB) has also contributed USD 2.75 billion in the development of renewable energy projects in its member countries (MC) (Obaidullah, 2018; Zervos, 2018). Obaidullah (2018) analyzed how various Islamic financial modes like *Mudarabah*, *Musharkah*, *Ijarah*, *Murabaha*, credit sale,

and *Istisna* can be employed to finance climate protection projects. He also highlighted how Zakat and Waqf institutions can be supportive in this regard.

6.5 Islamic Finance and Circular Economy

From contemporary scholarly discussion on financial sustainability, a new course of sustainability is discovered known as the circular economy. It is the concept that adopts the productive mentality of 'reducing wastage, reusing, and recycling the resources' rather than focusing on the linear notion of 'taking, making, and wasting' (ING, 2015). Consequently, it flows the resources toward their best possible efficient use along with economic development (Naja, 2015). The circular economy is a multidimensional compelling nature course of sustainability because it takes the financial, economic and environmental benefits and costs into consideration in integrating way. Therefore, it takes care of all stakeholders, the general public and the environment (ING, 2015).

As per Quranic revelation, mankind is the earthly representative of Almighty Allah (Al-Quran, 2: 30). Therefore, it is his responsibility to take care of all His creatures along with his interest. In this way, it becomes his first duty to use the resources in the best efficient way. Looking at the goals of circular economy, it seems to be a model paving the way toward the achievement of higher Shariah objectives of protection of life, the future generation, and wealth in broader terms. Islamic economy adopts both preventive as well as promotive strategies. Islamic forbids the waste of resources and considers it a sinful offense in one hand (Al-Quran, 7: 85)[40] and encourages the best efficient use of them on the other hand (Bukhari, 256H). Subsequently, it would not be wrong to say that the basic theme of circular economy has its roots in Islamic law.

The circular economy suggests selling the utilization rather than ownership. Aboul-Naja (2015) integrated this concept with Islamic finance employing the Ijarah model. He says that the ownership of goods increases the volume of wastage of resources. The owner produces goods to make a profit for himself, but he does not bother much about the durability of his product. If ownership is replaced with the utilization of the asset, then the durability of the goods can be increased which is the basic objective of the circular economy. Therefore, he presents the idea that the Islamic financial model of Ijarah (lease) is the best approach where the consumer will get the usufruct of the asset against specific rental rather than ownership on it. The asset

[40] Al-Baqrah, 2: 205, Al-Room, 30: 41, Bukhari, 1: 57, 1: 43, Ibn Majah (273H). *Sunan Ibn Majah*. Dar Ihya al-Turas al-Arabi, 2: 784. Abu Daud (275H). *Sunan Abu Daud*. Al-Maktaba al-Asriyah, Berut. 4: 361.

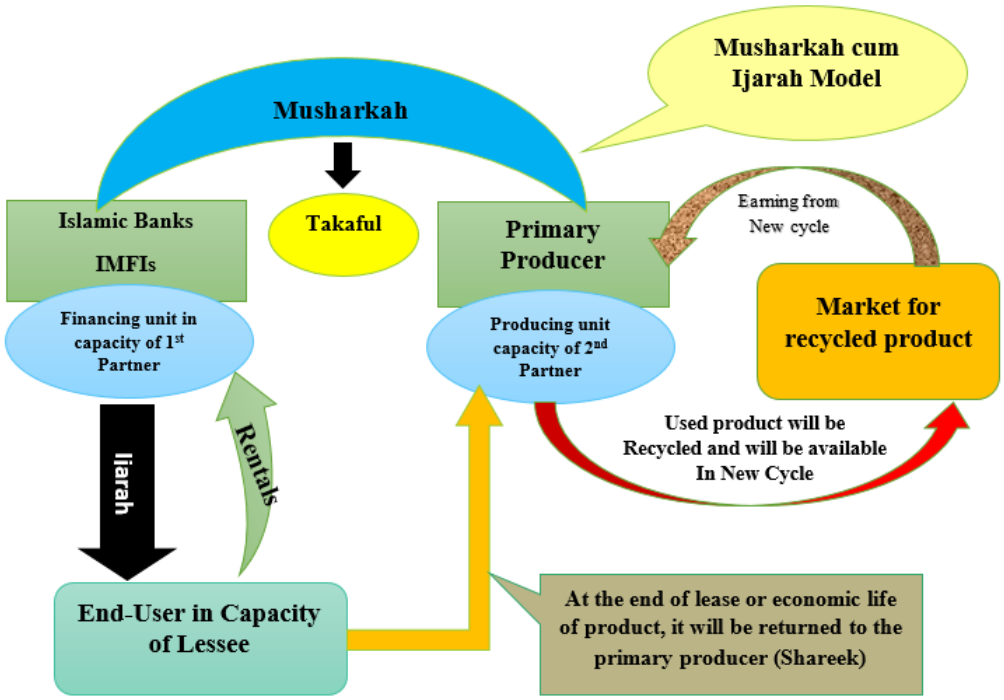
will be returned to the owner after the utilization. This approach will motivate the producing unit of the economy to produce durable goods of high quality. Finally, it will serve the objective (Aboul-Naja, 2015).

Two possible models can be suggested using the idea of a circular economy. The first model is encouraging the primary producer to make durable goods to sell the utilization of the products rather than ownership. After the economic life of the product, they will recycle it to make the raw material useful. It is quite possible that they may not obtain economies of scale, but employing the 4-R strategy of circular economy will give them benefit along with increasing the National resources durability. The second model needs new companies creating new markets for used recycled products and materials. Innovative strategies will be required for the effective use of recycled products in the new cycle so that they may attract the people. Both models will enhance the residual value of the products. Otherwise, it will be equal to zero in some cases and will be less than zero because of additional disposal costs.

6.6 Musharkah cum Ijarah Model

Regarding the diversification of financial modes, the lap of Islam is very fertile. The both above mentioned models of circular economy could be integrated with Islamic finance through the Musharkah cum Ijarah (MCI) model. MCI model works on three levels. In the first model, Islamic banks, IMFIs and primary producers of a specific product will jointly own a product under the *Shirkat ul aqd* contract. Later, they will lease it out to the end-user of it against pre-agreed rentals that will be shared between them as per the principles of *Shirkat ul aqd*. In this way, the risk will be shared between IBs/IMFI and producers. By using the provision of takaful, they can hedge their associated risk. Such risk and cost-sharing model will encourage producers to produce durable products on one side and it will be more efficient to the end-users on the other hand, because the same benefit of an asset will be accessible to them now in a small amount of rental money. The corpus of the product will return to the owners at the end of the lease period, which can be the end of the economic life of the product. The primary producer, in the capacity of the partner, will recycle the used product or renew the product for another cycle and the cost of the procedure will be shared between the partners. The earnings of the recycled products from the new cycle will again be distributed between partners according to their pre-agreed shares. See Figure 5. If the government pays attention to this model, this model can lead to exponential growth in the economy.

Figure 5: Musharkah cum Ijarah Model A



The second model actually is an extension of the first model where Musharkah will be terminated at the end of the economic life of the product. This model requires the creation of another company to adopt the approach of reduce, reuse, recycle, and renew the product with some new upgraded qualities and specifications. There are again two possibilities. One is that the producing unit of MCI model may create a new business subsidiary to achieve the objectives of the circular economy. For this purpose, it will buy the financier's share in the product at its residual value at the maturity of Musharkah (Figure 6a). Another possible way is that the government may play its role to install new companies to get benefits of the circular economy (Figure 6b) and the government can do it at the macro level. Consequently, it will instigate national economic growth by introducing new innovative industries, employment opportunities, and the efficient use of resources.

Figure 6a: Musharkah cum Ijarah Model B

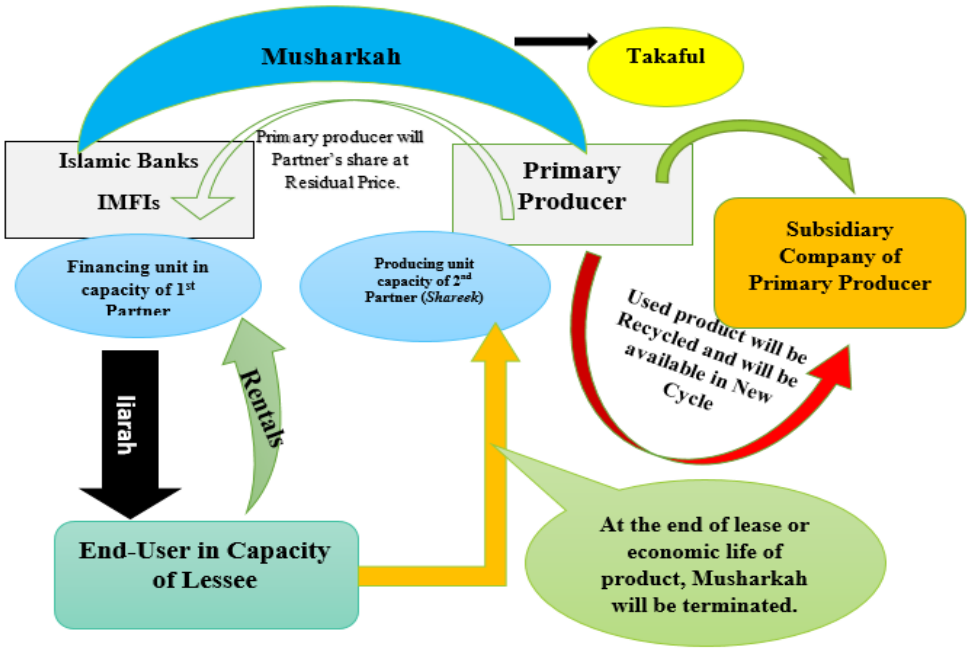
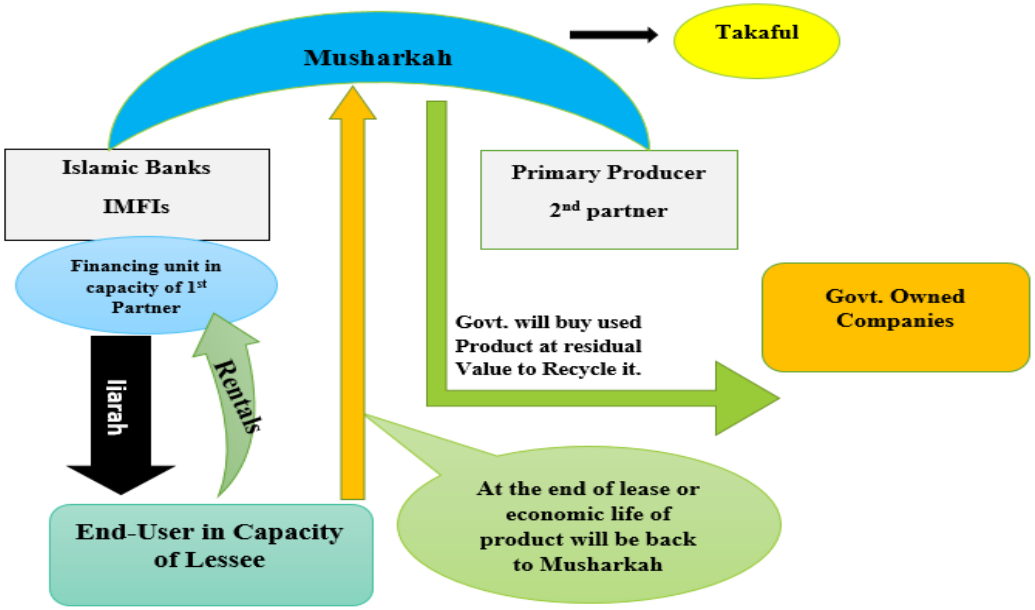


Figure 6b: Musharkah cum Ijarah Model C



7. Concluding Remarks and the Way Forward

Despite the large number of hits on the concepts of CE, GE, and SD, there is a dearth of coherent understanding of the interconnections between these concepts. Although the academicians, practitioners, and policymakers at both national and global levels as key sustainability avenues are currently considering the three concepts, there is a dire need to understand the interconnections between them. Knowing and identifying the integral role of Islamic finance in promoting and enabling the operationalization of the concepts is also indispensable for policymakers, businesses, and financial institutions.

Keeping in view the gaps in the existing literature, the aim of this paper is to establish the interconnections between the three concepts. The second objective of the paper is to link the principles, responsibilities, objectives, and business models of Islamic finance with social, economic, and environmental sustainability. Further, the paper aimed at pointing out potential dimensions, scopes and, in-built characteristics of Islamic finance that may facilitate the process of the realization of the CE, GE, and, SD targets and objectives. The paper also suggests a business model for Islamic banks to actively participate in the process of transformation of the conventional linear economic system towards a circular economic system, which has recently gained a great attention from policymakers, practitioners, and academia for attaining long-term economic, social, and environmental sustainability.

The paper suggests that both CE and GE concepts are rooted in the ideas of eco-efficiency, resource efficiency, renewable energies, low carbon emissions, and improvement of nature capitals. On the other hand, the ideas of CE and SD mainly focus on intra and interrogational commitments, integration of non-economic aspects into development in order to achieve sustainable production and conception patterns. It has emerged that the conceptualization, implementations, and evolution of CE, GE, and SD highly assimilates the ingredients of resource efficiency and decoupling, sustained and inclusive economic growth, preservation of environment, and promotion of sustainable consumption and production patterns.

The paper indicates that the role of Islamic finance is essential in harvesting the benefits associated with all three concepts. The Shariah-compliant business models and products of Islamic finance provide an edge to Islamic banks over their conventional counterparts to provide financing at all stages to promote the CE, GE, and SD activities. Finally, the paper proposes a business model based on Musharkah cum Ijarah for enhancing the transformation of linear economy towards CE.

From a policy viewpoint, more coordinated actions are needed at all levels of the implementations of CE, GE, and SD. The harmonization of the conceptual paradigms, theoretical frameworks, and practical strategies of CE, GE, and SD help adoption and transformation of the current linear economic system towards a circular economic system, which will not only results in long-term local, national, and global sustainability but enable us to achieve social-ecological goals in an effective manner. It is also recommended that there is a need to refine, clarify, and systemically nest all the three concepts in a more holistic single framework without compromising on their own recognition and intrinsic diversity, promoting the more interlinked descriptions and applications of CE, GE, and SD. There is also a dire need to identify common challenges and barriers in practical implementations of these concepts in true letter and spirit. The provision of funds is essential for the implementation, growth, and sustainability of any business models. Islamic financial Institutions have in-built characteristics to provide multidimensional compelling nature course to sustainability in terms of economic welfare, social well-being, environment preservation, and financial inclusion. Further, the inherent features of Islamic finance such as equity-based instruments, asset-based banking, profit and loss sharing mechanism, more focus on social welfare and ethical, and socially responsible investments to promote justice and equality in the society (Nosheen and Rashid, 2019) will definitely help attain long-term economic, social, and environmental sustainability. Governments, private firms, corporate businesses, and financial institutions should design their business models based on the concept of sell utilizations rather than ownerships to gear up the transition process of the existing economy to the one characterized by ecological, biological, and sociological aspects.

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SESSION V:

REIMAGINING ISLAMIC FINANCE: DEMONSTRATING IMPACT AND POSITIVE CHANGE

Solving the Problem of Water and Sanitation in Nigeria through the use of Blended Finance

Abdulrahman Olukade, Jainaba Kolley & Mubarak Mohammed Kabir Musa

Rising shortage of water, sanitation, and basic hygiene facilities pose a threat to the development of Nigeria and its people. A large segment of the Nigerian population in both the urban and rural communities lack access to improved water and sanitation facilities. Open defecation is widespread in many parts of the country. These problems have had resultant social impacts in the form of out-of-school children, reduced productivity, cholera and other water-borne diseases outbreak. The government of Nigeria is committed to achieving access to water and sanitation for all by the year 2030 in line with the SDG initiative and the National Water Sector Road Map of 2010. However, a reduction in government revenues occasioned by falling oil prices and competition by other critical infrastructural needs has created a huge funding gap in the water and sanitation sector. The purpose of this research is to engineer a blended Islamic finance structure that can help in bridging the funding gap to achieve the sustainable development goals, national aspirations and the higher objectives of shariah.

ESG Analysis, Corporate Governance and Shariah Screening: Mutual Learnings for a Better Investment Climate

Valeed Ahmad Ansari, Shariq Nisar

Islamic wealth managers make investments after filtering investment opportunities using Shariah screening methodology. The first ever shariah screening process was developed by Dow Jones in 1999. Even after 20 years, the rules for shariah screening remains almost the same. All the rules are designed to minimise involvement of Islamic wealth managers into activities which are prohibited in Islam such as Riba, Gharar and Maysir, etc. Islamic Funds size over the last two decades has reached about $68 billion. On the other hand, ESG which is an off shoot of Socially Responsible Investment (SRI) was first introduced in 2005 in a landmark study entitled “Who Cares Wins” and has since reached an estimated size of over $20 trillion. SRI too began with negative screening but built on its experience and moved to

add positive screening too. Today ESG is a movement with thousands of “ESG Analyst” and a benchmark for corporate governance.

This paper will look at the process of ESG Analysis and how Corporate Governance Scorecards are prepared and make an attempt to gain insights that can help improve Shariah screening process by adding positive filters.

Social Responsibility of Islamic Banks via Circular Economy Projects

Ahmed Khalaf al-Dikhil

This study sheds light on the definition of circular economy and the societal responsibility of Islamic banks in enhancing and implementing Circular economy programs through adopting actions which are in line with the Islamic law or driven by incentives of achieving rewards or quitting vilified business.

The study concluded that the driven forces towards societal responsibility are societal behavior, societal result and the causal relationship between them. The study argues that social responsibility differs from shariah responsibilities and legal responsibilities. The legal basis of societal responsibilities is embodied in the mandoub, the makrouh and mubah of the defining laws of Sharia.

The applications of societal responsibility are manifested in voluntary applications that are based on reducing the costs of production, advertising and aim to score the highest ranks in the social responsibility organisations. Not to mention the applications driven by incentives provided by the state to encourage banks to embrace circular economy programs by offering them moral privileges such as tax exemptions، contracting priority in public projects and granting certificates of gratitude and appreciation.

The study urged countries, international organizations and civil society organizations to host conferences and seminars to facilitate further discussions, researches and studies of social responsibility related matters to develop mechanism which facilitate the of linkage of Islamic banks to the circular economy in a manner that allows to unlock and taking advantage of the capabilities of Islamic banks in this regard. The study also emphasiz the need to establish specialized Islamic organizations to set standards, indicators and classifications for the social responsibility of Islamic institutions, especially in the field of circular economy.

Finally, the study recommended that the Auditing and Accounting Authority for Islamic Financial Institutions (IOFI) adopt a special standard for the Islamic financial institutions to accredit the official Community Mechanism in the framework of the circular economy.

The Impact of Sustainable Banking Practices on Banks' Stability

Adam Ng, Kinan Salim, Ginanjar Dewandaru, Malik Abdulrahman Nkoba

Abstract

This study seeks to examine whether corporate environmental performance (CEP) and corporate social performance (CSP) affect stability of the banking industry. The topic is of much interest to researchers and policy makers following the global financial crisis of 2007-2009. Using a panel dataset of 473 banks in 74 countries from 2007 to 2016 and applying Generalized method of moments (GMM), we find that corporate environment performance (CEP) is negatively related to bank stability which is proxied by non-performing loans (NPL). On the other hand, our results suggest no significant relationship between corporate social performance (CSP) and bank stability. However, estimation using financial product safety as an aspect of corporate social performance shows a positive link to banks stability. The study contributes to the literature by using material dataset and providing new evidence on the relationship between CEP, CSP and bank stability. Our results are robust to a variety of econometric specifications and have significant policy implications for investors, bankers and regulators.

1.0 Introduction

Over the past few decades, concerns about sustainability have been gaining popularity owing to increased awareness among stakeholders on the adverse social and environmental impact of corporate actions. Organizations across various industries are harnessing a longer-term perspective and adopting sustainable business practices to address these concerns. Considered as a sector that is vital to a country's economic development (G. King, Robert & Levine, 1993; Beck et al., 2000), the banking sector plays an important role in sustainable development (Nizam et al., 2019). Sustainable responsible investing (SRI), corporate social responsibility (CSR), environmental, social & governance (ESG) and value-based intermediation (VBI) are

some buzzwords sparking much interest and discussions lately, as the focus of finance and investment moves from absolute wealth maximization to a notion of sustainable and ethical finance. However, the question of whether embracing sustainable social and environmental practices can translate to positive economic outcomes to a business is still debateable. As Brooks and Oikonomou (2017) puts it *"the possibility of the existence of a financial impetus for responsible corporate behaviour is sufficient to reposition the debate from the sphere of moral philosophy and business ethics to that of modern economics"* (p. 2). Proponents of corporate sustainability use stakeholder's theory proposed by Edward Freeman (1983) who argued that companies experience interconnected relationships with its customers, suppliers, employees, governmental bodies, investors, communities and others who have a stake in the organization. The theory contends that companies should create value for not just shareholders but all stakeholders. No company can survive if it only has shareholders economic gain in mind. Since the community and the environment are part of the stakeholders affected by corporate actions, this implies that being socially and environmentally aware is necessary for survival of a company. While this may be true, shareholders theory introduced the renowned economist Milton Friedman (1970), argues that there is one and only one social responsibility of business, "to use its resources and engage in activities designed to increase its profits". The theory reasons that adoption of CSR results to misappropriation of shareholders wealth as it imposes an unjustified tax on shareholders and its costs outweigh any potential benefits. Trying to strike the balance between the two theories, "the enlightened shareholders value" argues that "effective corporate social responsibility management is not incompatible with shareholder value and having wider interests can be the key to long-term financial performance" (Andreadakis, 2013. p.416).

Despite the growing literature, empirical evidence on the effect of adopting sustainable practices to financial performance of an entity is mixed. Several studies have supported the nation that there is a positive link between sustainable practices and companies' performance (Spicer, 1978; Zhu et al., 2012; Shrivastava, 1995; Al Mamun, Sohog, & Akhter, 2013). These studies suggest that good social and environmental practices help companies attain competitive advantage which ultimately lead to better financial performance. Conversely, other studies have found a negative relationship between sustainable practices and firm's financial performance (Walley and Whitehead, 1994; McWilliams & Siegel, 1997; Hillman & Keim, 2001; Jensen, 2002; Brammer and Millington, 2008; Tang et al., 2012). The main argument posed by these studies is that sustainable initiatives often increase operational costs and as a result product price. This negatively affect both financial performance and market share.

Finally, Kang, Lee, & Huh, (2010) reports no link between CSR and corporate financial performance.

In the banking sector, some studies found a positive relationship between corporate social performance (CSP)/Corporate environmental performance (CEP) and corporate financial performance (CFP) (Simpson and Kohers, 2002; Cornett et al., 2014; Nizam et al., 2019). Others suggest that banks that embrace social and environmental sustainability have lower financial performance as compared to their counterparts (Soana, 2009; Nollet, Filis, and Mitrikostas, 2016). Yet some found that no significant relationship exists between corporate financial performance and sustainability (Chih, Chih, and Chen, 2010). While the focus in most of the existing literature has been assessing the relationship between sustainability and banks financial performance using profitability measures such as returns on assets (ROA) and return on equity (ROE), little is known about the effect of adopting sustainable practices to the stability of the bank. Bank stability is among the most important aspect of a sound financial sector since the banking industry serves as a major channel through which instability may be spread to other sectors in the economy via interbank money market disruption (Klapper, Ariss & Berger, 2009). Though very limited, some evidence points out a positive link between sustainability and banks' stability (Jevons, 1884; Hornbeck, 2012) while others found no difference in the stability of banks adopting sustainable practices and those which do not (Olaf & Oni, 2016). This study contributes to the literature by providing comprehensive evidence on the relationship between corporate social performance (CSP), corporate environmental performance (CEP) and bank stability (BS).

In many industries, there has been a growing evidence attempting to see the relationship between product safety and corporate social performance. For example, studies from food industry and manufacturing industry suggest that ensuring product safety is an integral part of company's sustainable practices (Boileau, 2016; Epuran et al., 2018). This implies that sustainability performance improves with enhancement of product safety. However, little or no evidence exist from the banking industry on the 'financial product safety-corporate social performance' nexus and if product safety can be a channel through which banks corporate social performance (CSP) affect corporate financial performance (CFP). Just like the way consumers can be tricked into buying dangerous products, consumers who use credit cards, home mortgages, car loans and other financial products can be deceived into buying products they can't afford which may place them in financial distress. This can have negative spill over effect to their productivity (Kim & Garman, 2003), debt (Bagwell, 2000) as well as health (Drentea, 2000). Due to this gap, our research attempts to examine if financial product safety

is a channel through which corporate social performance (CSP) can translate to more stable banks.

The main objective of this study is to investigate the relationship between corporate social performance (CSP), corporate environmental performance (CEP) and bank stability (BS). The study aims to (i) assess whether corporate social performance (CSP) and corporate environmental performance (CEP) have significant impact on bank stability (BS), and (ii) examine if there is any variation of the impact of corporate social performance (CSP) and corporate environmental performance (CEP) to bank stability (BS) across banks with different sizes and countries with different social and environment scores, and (iii) investigate whether financial product safety is a channel through which corporate social performance (CSP) can affect bank stability (BS).

We find that corporate environment performance (CEP) is negatively related to bank stability which is proxied by non-performing loans (NPL). On the other hand, our results suggest no significant relationship between corporate social performance (CSP) and bank stability. Accounting for countries sustainability performance, we report that corporate environmental performance (CEP) has an insignificant impact to bank stability in countries with poor environmental scores and positive significant impact (to bank stability) in countries with good environmental scores. On contrary, corporate social performance (CSP) has an insignificant impact to bank stability regardless of a country's social score. Considering variation in terms of bank size, our results reveal that there exists a negative relationship between corporate environmental performance (CEP) and bank stability for mid-sized banks, but the relationship is insignificant for extremely small and extremely large banks. Finally, with respect to financial product safety, we find that financial product safety as an aspect of corporate social performance (CSP) is positively related to banks stability.

This study has accounted for materiality aspect of the social and environmental indicators that affect the banking sector. This has been done by using material dataset that classifies ESG issues based on their materiality in different sector. As mentioned by Nizam et al., 2019, *"Materiality is key in the study of sustainability performance in the banking sector. Without materiality determination, the study would not be able to open the door to measuring sustainability effectively if not accurately"* (p. 2). Therefore, this study considers the reliability and comprehensiveness of the dataset. We also control for bank-specific variables and the macroeconomic variables.

The rest of the paper is organized as follows: *Section 2* reviews the existing literature, *Section 3* discusses the methodology used to address the research objectives, *Section 4* presents

the empirical findings, and *Section 5* highlights the contribution of the study, makes recommendations, identifies limitations of the study and suggests the potential areas for future research.

2.0 Literature review

2.1 Sustainability performance and economic benefits: Theoretical underpinnings

The question of what corporate objective should be has been a subject of debate for many decades. Some have described it as an extremely varied, open-ended and inclusive topic that has remained an abstract notion for many years in the corporate vocabulary (Clark, 1986). Such debates have sparked emergence of two opposing schools of thought built upon different philosophies and presenting several arguments, the shareholders theory and the stakeholder's theory. While the stakeholder's theory contends that companies should create value for not just shareholders but all stakeholders, the shareholder's school of thought argue that there is one and only one social responsibility of business, "to use its resources and engage in activities designed to increase its profits". Attempting to strike the balance between the two theories, "the enlightened shareholders value" argues that "effective corporate social responsibility management is not incompatible with shareholder value and having wider interests can be the key to long-term financial performance" (Andreadakis, 2013. p.416).

2.1.1 Shareholders Theory

Initially proposed by Milton Friedman, the shareholders theory states that the sole responsibility of a firm is to increase profit or shareholders wealth. This theory is built upon the idea that managers are appointed as agents of shareholders and all actions they do should be in the interest of the principals. The theory reasons that adoption of CSR results to misappropriation of shareholders wealth as it imposes an unjustified tax on shareholders and its costs outweigh any potential benefits. Applying shareholders theory in the context of our paper, one can argue that adoption of good social and environmental practices involves costs which reduces the benefits that accrue to shareholders. Such resources could be diverted to credit monitoring and following up collection of loans which reduces non-performing loans (Aswaf, Bogale & Teame, 2016) and enhances bank stability. As such, using this approach, one should expect that banks with lower corporate social performance (CSP) and corporate environmental performance (CEP) should be more stable. However, the theory has been subjected to several criticisms following the collapse of companies and major banks such as

Northern rock in the UK and Lehman Brothers in the US which were associated with poor corporate governance. A path change was necessary, as corporate governance structures were under scrutiny for all these failures and stakeholders had lost their trust to the system (Andreadakis, 2013)

2.1.2 Stakeholders Theory

Stakeholder theory, on the other hand, is of the view that a company has responsibility to a wider range of stakeholders such as customers, suppliers, employees, community and the surrounding environment. Freeman defines stakeholders as "any group or individual who can affect or is affected by the achievement of the organization's objectives". Since the community and the environment are part of the stakeholders affected by corporate actions, being socially and environmentally aware is necessary for survival of the company. Using the stakeholder theory in the context of banks social and environmental performance, it can be argued that it's within the corporate objectives of a bank to adopt sustainable practices as they affect the community and the environment, both of which are part of its stakeholders. Empirical evidence suggests that observing the needs of stakeholders like customers affect positively shareholders returns (Watson & Ogden, 1999). More generally, one should expect that companies with higher corporate social performance (CSP) and corporate environmental performance (CEP) should have higher corporate financial performance (CFP). Similarly, banks with higher corporate social performance (CSP) and corporate environmental performance (CEP) should be more stable. One rationale for is that they will be shielded against losses that may have arose from loans to clients who are significantly affected by lawsuits arising from negative social and environmental effects of corporate actions.

2.1.3 Enlightened Shareholder value

Striking a balance between shareholders and stakeholder theories, the enlightened shareholder value (ESV) states that companies should pursue maximization of shareholder wealth with a long-run angle that seeks sustainable growth and profits (Miton, 2010). Developed by Jensen (2001), the theory does not merely combine the existing two theories but recognizes the fact that companies cannot maximize their value without taking good care of stakeholders (Andreadakis, 2013). Jensen's theory blends the Friedman's objective of profit maximization within the rules of the game with an aspect of morality drawn from Freeman's stakeholder's theory. Nonetheless, the theory has been criticized for being shareholder-centric and lacks clarity on how the interest of all company's stakeholders can balanced (Andreadakis, 2013).

2.2 Sustainability and financial performance

The relationship between corporate social performance (CSP)-corporate financial performance (CFP) and corporate environmental performance (CEP)-corporate financial performance (CFP) has been widely discussed in the literature. However, the existing empirical evidence presents mixed results. While some studies found a positive link (Spicer, 1978; Zhu et al., 2012; Shrivastava, 1995; Al Mamun, Sohog, & Akhter, 2013; Albertini, 2013; Moneva, Jose & Ortas, Eduardo, 2010; Margolis et al., 2009)), others suggest that CSP and CEP have a detrimental effect on CFP (Walley and Whitehead, 1994; McWilliams & Siegel, 1997; Hillman & Keim, 2001; Jensen, 2002; Brammer and Millington, 2008; Tang et al., 2012; Cordeiro & Sarkis, 1997). Using meta-analysis, Albertini (2013) integrated findings on CEP-CFP relationship from 52 studies over 35-year period. Her study revealed a positive relationship between corporate environmental performance (CEP) and corporate financial performance (CFP) using all different measures of CEP and CFP. Similarly, using a sample of 230 European companies and applying partial least squares model (PLS) for measuring corporate environmental and financial performance, Moneva, Jose & Ortas, Eduardo (2010) supported the notion that companies with better environmental performance show better financial performance levels. As for the CSP-CFP nexus, a meta-analytical study by Margolis et al., (2009) covering 251 studies revealed a positive link between CSP and CFP. Their study indicated that the CSP-CFP relationship is stronger when CSP is assessed more broadly through observer perceptions and self-reported social performance and weaker when assessed through third-party audits and mutual fund screens.

Of particular relevance to corporate social performance (CSP) is the aspect of product safety. As part of social sustainable practices, companies in various industries have been improving their product safety to protect and preserve the interest of product users. For example, in the food industry, "addressing the issue of food consumption in the context of food safety is most often done in close relation to sustainability and value creation" (Epuran et al., 2018, p. 153). Product safety is also a key social concern in the manufacturing industry. As mentioned by Boileau (2016), sustainable equipment manufactures incorporate protective features in their products to ensure that the product sold is safe. Nonetheless, some studies present opposite findings on the CSP/CEP-CFP nexus. Using a sample of 537 firms quoted on the London Stock Exchange, Brammer and Millington, (2008) reported that firms with unusually high or low CSP experience higher CFP. Likewise, utilizing security analyst earnings forecast as a measure of CFP and covering a sample of 523 US firms, Cordeiro & Sarkis (1997) demonstrated a significant negative relationship between environmental proactivist and financial performance.

2.3 Sustainability in the banking industry

2.3.1 Sustainability and financial performance

Despite promising evidence of the CSP-CFP and CEP-CFP relations in different industries, studies from the banking industry are still limited and presents mixed results. For instance, Simpson and Kohers, 2002; Cornett et al., 2014; Nizam et al., 2019 reports a positive link where as evidence from Soana, 2009; Nollet, Filis, and Mitrikostas, 2016 suggest presence of a negative relationship. Nonetheless, others reported no significant relationship between corporate financial performance and sustainability (Chih, Chih, and Chen, 2010). Using a sample of 385 US based banks and employing Ordinary least squares (OLS), Simpson and Kohers (2002) found a positive relationship between corporate social performance (CSP) and corporate financial performance (CFP). The same sentiments were discovered in the study of Nizam et. al (2019) who examined the empirical link between CSP and CFP with a sample of 713 institutions from 75 countries. Using on cross-sectional linear regression and non-linear threshold regression techniques, the study found a positive link in both CSP-CFP and CEP-CFP relationships. On contrary, using Bloomberg's Environmental Social Governance (ESG) Disclosure score covering the S&P500 firms in the period 2007–2011, Nollet, Filis, and Mitrikostas (2016) reported a negative link between the social sustainability and financial performance. Nevertheless, based on the non-linear regression, their findings suggest a U-shaped relationship indicating a positive social-performance effect in the long run. Moreover, a study by Chih, Chih, and Chen (2010) empirically investigated 520 financial institutions in 34 countries between 2003 and 2005 and found that there are no significant links between CSR and financial performance.

2.3.2 Sustainability and bank stability

Banks operate in an industry that is subjected to strict regulations and other monitoring mechanism such as robust internal controls and mandatory audits. Despite the presence of these controls, the 2007-2008 global financial crisis still did occur. Since then, various studies have attempted to explore the relationship between other non-regulatory factors and bank stability. Such studies hypothesize that, apart from the formal regulatory mechanism, aspects like social capital, financial inclusion and sustainability, have a role to play on the stability of the banking industry. Using a sample of more than 5500 banks, Yiqiang et al., (2017) found that banks in high social capital regions experienced fewer failures and less financial trouble during the 2007–2010 financial crisis than banks in low social capital regions. Likewise, with an international sample of 2635 banks in 86 countries over the period 2004–2012, Mostak and Mallick (2017) found that higher level of financial inclusion improves bank stability. The

banking sector has been seen to play an important role in sustainable development (Nizam et al., 2019) yet, little is known on how better sustainable practices affect the soundness of the banks. Though very limited, some evidence points out a positive link between sustainability and banks' stability (Jevons, 1884; Hornbeck, 2012) while others found no difference in the stability of banks adopting sustainable practices and those which do not (Weber & Oni, 2016). The famous British economist, William Jevons (1884) argued that sunspots that cause drought and poor harvests in agro-based countries adversely impact international trade which subsequently lead to significant bank losses and financial crises. Furthermore, the dust bowls in the firm belt states that affected the United States in 1880s, 1890s and 1930s was as a result of soil erosion caused by unsustainable farming methods. Such dust bowls were subsequently followed by economic downturns which led to significant loses on bank loans and economic instability (Hornbeck R, 2012). These studies support the notion that there is a link between sustainability and bank stability. They imply that banks and more generally countries that prudently observe their community and environment and embrace more sustainable practices have more stable financial systems. While this may be true, using a sample of 46 Chinese banks and credit unions with a dataset from 2009 to 2013, evidence from Weber and Oni (2016) suggest that no significant correlation exist between sustainability performance and the non-performing loan ratio.

Similarly, there has been a growing evidence attempting to see the relationship between product safety and corporate social performance. For example, studies from food industry and manufacturing industry suggest that ensuring product safety is an integral part of company's sustainable practices (Boileau, 2016; Epuran et al., 2018). This implies that sustainability performance improves with enhancement of product safety. However, little or no evidence exist from the banking industry on the 'financial product safety-corporate social performance' nexus and if financial product safety can be a channel through which banks corporate social performance (CSP) affects the corporate financial performance (CFP). Bollen (2015, p. 12) stresses that

"The primary issue is whether the client will be better or worse off having acquired the product… (product safety where there is a real risk the client will be worse off for having acquired it if it does not meet expectations). This includes loss of opportunity to acquire an appropriate product (e.g. where they could have acquired a different insurance product that much more closely covered the risks they were exposed to)"

Just like the way consumers can be tricked into buying dangerous products, consumers who use credit cards, home mortgages, car loans and other financial products can be deceived into

buying products they can't afford which may place them in financial distress. This can have negative spill over effect to their productivity (Kim & Garman, 2003), debt (Bagwell, 2000) as well as health (Drentea, 2000). Due to this gap, our research attempts to examine if financial product safety is a channel through which corporate social performance (CSP) can translate to more stable banks.

3.0 Data and Methodology

3.1 Data and sample

We use an unbalanced panel dataset of 473 banks in 74 countries from 2007 to 2016. While the data for bank specific variables was obtained from FitchConnect, the data on environmental and social variables was fetched from the MSCI ESG research database. Considered as one of the leading comprehensive ESG database, the MSCI ESG database has been extensively used in recent literature (Nizam et al., 2019; Cornett, Erhemjamts, & Tehranian, 2014; Erkens; Fatemi & Fooladi, 2013; Liang & Renneboog, 2016; Nagy, Cogan, & Sinnreich, 2013; Nagy, Kassam, & Lee, 2015; Rahdari & Anvary Rostamy, 2015; Liang & Renneboog, 2016; Khan et. al, 2015) In contrast to Bloomberg and Thomson Reuters which do not consider materiality of ESG issues in different sectors, MSCI ESG database categorizes ESG issues based on their materiality in different sectors. It adopts a comprehensive approach that sources data from governments, NGOs, company's disclosure such as sustainability reports and more than 1600 media sources that are monitored daily (MSCI, 2018). This makes the dataset used in this study comprehensive and reliable. Describing the MSCI ESG database, Mattingly & Berman (2006), refers to it as *"the standard for quantitative measurement of corporate social action"* (p. 28). On the other hand, data on macroeconomic variables and ES country scores were obtained from the world bank and Bloomberg respectively. **Table 3.1** provides a summary of the description and sources of variables used.

Table 3.1: Variables, sources and descriptions

Variable	Description	Source
BS: Bank-specific Variables		
Non-performing loans	Impaired loans (NPLs) / gross loans	FitchConnect
Loan loss reserve	Reserves for Impaired Loans/ Gross loans	
Size	total assets	
Return on Assets	Net Income / Average Total Assets	

Variable	Description	Source
Equity to total assets	Equity to total assets	
Net interest margin	Net interest income to Total earning assets	
Assets growth	Assets growth	
Non-interest income	Total non-interest income / (interest dividend income + total non-interest income)	
Efficiency ratio	(Personnel expenses + Other Operational Expenses)/ (Interest dividend income + Total non-interest income)	
MS: Macroeconomic Factors		
GDP Growth	Real GDP growth	World Bank
Inflation	Inflation	
SE: Social and Environmental Sustainability Performance Factors		
Environmental pillar score	Weighted average of all material key issues that fall under the MSCI ESG environment pillar	MSCI ESG
Social pillar score	Weighted average of all material key issues that fall under the MSCI ESG social pillar	
CSE: Country's Social and Environmental Sustainability Performance Factors		
Environmental Country	Country environment score	Bloomberg
Social Country	Country social score	

3.2 Determinants of banking performance

The study collects bank-specific and macro-economic data from FitchConnect and World bank respectively. The following section presents the detailed variable determinants.

3.2.1 Bank-specific variables

Dependent variable

The banking sector stability depends in large part on the size of non-performing loans (NPLs) (Ronald et al, 2018). These are bank loans that are subject to late repayment or are unlikely to be repaid by the borrower. The higher the size of non-performing loans the lower the stability of a bank. Consistent with Atilla (2015), we use non-performing loans as our main performance indicator of bank stability. Non-performing loans is measured as a ratio of impaired loans to gross loans.

Explanatory variables

To ensure comprehensiveness, we use the MSCI environmental pillar score as a proxy for corporate environmental performance (CEP). This represents the weighted average of all material key issues that fall under the environment pillar. As for the corporate social performance (CSP), we use the social pillar score which represents the weighted average of all material key issues that fall under the social pillar of the MSCI ESG database. Bank specific control variables such as loan loss reserve to gross loan, total assets, return on assets, equity to total assets, net interest margin, assets growth, loans to total assets, non-interest income and efficiency ratio have been accounted for in our econometric estimation. These variables have been widely used in existing literature (Nizam et al., 2019; Cornett et al., 2014; Sanya and Wolfe, 2010; Stiroh and Rumble, 2006; Zamore, 2017). The descriptive statistics of the variables are illustrated in **Table 3.2. Table 3.3** presents results of the Pearson's correlation[41] matrix. The matrix suggest that our dataset is free from multicollinearity.

Table 3.2: Descriptive Statistics

Variable	Observation	Mean	Std.Dev.	Min	Max
Non-performing loans	1,660	-3.960253	1.17924	-9.21024	0.3884105
Environmental pillar score	2,131	3.670055	2.329724	0	10
Social pillar score	2,131	4.869913	1.358059	0.9	9.78
Total assets	2,133	10.44463	1.896238	5.088288	15.00304
Equity to total assets	2,133	17.4408	23.40159	-85.37	100
Net interest margin	1,954	7.527418	186.5648	-115.27	8247.09
Loan to total assets	1,945	0.5685968	0.1824069	4.79E-06	0.981452
Non-interest income	1,937	0.2267535	0.1811596	-2.371566	0.9986092
Efficiency ratio	1,844	0.4031088	0.2901018	0.0021861	9.015267
Asset growth	1,609	0.1074197	1.278247	-0.9642544	38.22858
GDP growth	1,588	2.792716	2.229293	-9.772974	25.55727
Inflation	1,581	2.733872	7.956975	-1.538403	254.9485

[41] "The Pearson product-moment correlation coefficient, often shortened to Pearson correlation or Pearson's correlation, is a measure of the strength and direction of association that exists between two continuous variables. A Pearson's correlation attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient, r, indicates how far away all these data points are to this line of best fit (i.e., how well the data points fit this new model/line of best fit). Its value can range from -1 for a perfect negative linear relationship to +1 for a perfect positive linear relationship. A value of 0 (zero) indicates no relationship between two variables" (Laerd Statistics, 2017).

3.2.2 Macro-economic variables

To control for the macroeconomic environment in which the banks operate, we include the GDP growth and inflation as macroeconomic variables in our model. Previous studies have revealed that the financial performance of the banking industry is sensitive to inflation and GDP growth (Mirzaei et al., 2013). Dietrich and Wanzenried (2011) reports a positive link between GDP growth and financial performance. However, during financial crises, slow GDP growth affects negatively the credit quality of banks thereby reducing financial performance. Existing studies have also shown that there is close association between banks financial performance and inflation (Demirguc-Kunt et al., 2004).

Table 3.3: Pearson's correlation[42] matrix

VARIABLES	NPL	EPS	SPS	TA	EQTA	NIM	LTA	NIM	EFF	ASSET G	GDP G	INF
Non-performing loans	1											
Environmental pillar score	0.1665	1										
Social pillar score	0.2718	0.3909	1									
Total assets	0.0112	0.1636	0.2601	1								
Equity to total assets	-0.0091	-0.1438	-0.2146	-0.4865	1							
Net interest margin	0.1407	0.0739	0.0267	-0.5318	0.4576	1						
Loan to total assets	-0.092	-0.2737	-0.3436	-0.304	0.0576	0.1162	1					
Non-interest income	0.0001	0.0864	-0.0062	-0.0014	0.2105	-0.0684	-0.3307	1				
Efficiency ratio	-0.0788	-0.1545	-0.3266	-0.2993	0.1704	-0.0115	0.0444	0.4239	1			
Asset growth	-0.0811	-0.0116	-0.0116	0.0408	-0.0018	-0.0185	-0.0384	0.0228	-0.0213	1		
GDP growth	0.0206	-0.0723	-0.0049	-0.191	0.1001	0.2406	0.1652	-0.1479	-0.2189	0.0035	1	
Inflation	0.1045	0.1002	0.1658	-0.1401	0.1401	0.5901	-0.0429	-0.1293	-0.3169	-0.0066	0.0607	1

[42] "The Pearson product-moment correlation coefficient, often shortened to Pearson correlation or Pearson's correlation, is a measure of the strength and direction of association that exists between two continuous variables. A Pearson's correlation attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient, r, indicates how far away all these data points are to this line of best fit (i.e., how well the data points fit this new model/line of best fit). Its value can range from -1 for a perfect negative linear relationship to +1 for a perfect positive linear relationship. A value of 0 (zero) indicates no relationship between two variables" (Laerd Statistics, 2017).

3.3 Methodology and Model Specification

We adopt dynamic panel specification using Generalized Methods of Moments (GMM) estimators. Specifically, we use first difference GMM and System GMM. Endogeneity issue may arise in dynamic panel because of the correlation between the individual specific effect and the lagged dependent variable. First difference GMM use the lagged level variable as instruments to deal with endogeneity. System GMM estimator has both level variable and its first difference. Arellano-Bond auto-correlation test is used to confirm the absence of second order autocorrelation. In addition, Hansen test is used to verify the relevance of the instruments. We employ two-step procedure and robust standard errors of Windmeijer's (2005) finite sample correction.

Basic model:

$$LNPL_{it} = \alpha_i + \gamma LNPL_{it-1} + \beta Env\_pl\_s_{it-1} + \vartheta \text{Soc\_pl\_s}_{it-1} + \varphi BS_{it-1} + \delta MS_{it} + +\varepsilon_{it}$$

Eq1

Our dependent variable is the log-odds transformation of NPL (LNPL), i.e. LNPL=ln (NPL/(100-NPL)). In the above model, NPL is the ratio of impaired loans to gross loans, Env_pl_s is environmental pillar score (a proxy for CEP), Soc_pl_s is the social pillar score (a proxy for CSP), BS is a vector for all bank specific variable and MS is a vector for all macroeconomic variables. To account for country's social and environmental scores, we add the scores in equation one which gives rise to equation 2 below:

$$LNPL_{it} = \alpha_i + \gamma LNPL_{it-1} + \beta Env\_pl\_s_{it-1} + \vartheta \text{Soc\_pl\_s}_{it-1} + \varphi BS_{it-1} + \delta MS_{it} + \kappa env\_country_{it} + \theta soc\_country_{it} + \varepsilon_{it}$$

Eq2

Furthermore, to assess whether the effect of CEP and CSP to BS is identical for banks operating in countries with high and low environmental and social scores, we add interaction with country's scores to the models.

$$LNPL_{it} = \alpha_i + \gamma LNPL_{it-1} + \beta Env\_pl\_s_{it-1} + \vartheta \text{Soc\_pl\_s}_{it-1} + \varphi BS_{it-1} + \delta MS_{it} + \kappa env\_country_{it} + \theta soc\_country_{it} + \iota Env\_pl\_s_{it-1} * env_{country_{it}} + \psi \text{Soc\_pl\_s}_{it-1} * soc\_country_{it} + \varepsilon_{it}$$

Eq3

4.0 Empirical Findings

There are three key findings highlighted in the next section below under the following headings, namely (i) CSP-CFP and CEP-CFP nexuses (ii) Interaction with banks size and country's social and environmental scores; and (iii) Financial product safety (CSP)-CFP relation.

4.1 Key findings on CSP-CFP and CEP-CFP nexuses

Tables 4.1 highlight the results from the GMM linear estimation conducted on banks' CSP-CFP and CEP-CFP nexuses: While **Model 1-Model 5** shows empirical results without controlling for country's social and environmental scores, **Model 6-Model 10** controls for country's social and environmental scores. **Model 1 and Model 6** does not include any control variables. **Model 2 and Model 7** controls for three bank specific variables namely, total assets, equity total asset ratio, and net interest margin. Furthermore, **Model 3 and Model 8** adds on macro-economic variables i.e. inflation and GDP growth. While **Model 4 and Model 9** only controls for all bank specific variables, **Model 5 and Model 10** includes macro-economic variables as well. Results from Table 4.1 indicates that there is a significant positive relationship between corporate environmental performance (CEP) and non-performing loans (proxy for bank stability) in most Models. For example, in **Model 2**, 1% increase in corporate environmental performance score (CEP) will increase non-performing loans by 0.05%. On the other hand, in all 10 Models, results reveal existence of no significant relationship in the CSP-CFP nexus. For CEP-CFP, our results are in line with studies that suggest banks that embrace social and environmental sustainability have lower financial performance as compared to their counterparts (Soana, 2009; Nollet, Filis, and Mitrikostas, 2016). They denote that banks adopting sustainable environmental practices are less stable compared to those which do not. One plausible argument for this could be banks that adopt of good environmental practices incur costs which reduces the benefits that accrue to shareholders. Such resources could be diverted to credit monitoring and following up collection of loans which reduces non-performing loans (Aswaf, Bogale & Teame, 2016) and enhances bank stability. As for CSP-CFP relationship, results indicate no significant relationship between the two. This imply that adoption of sustainable practices by banks have no effect to their stability. This support the results reached by Weber and Oni (2016).

Table 4.1: Linear estimation

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Non-performing Loans	1.097***	0.640***	0.747***	0.658***	0.672**	0.881***	0.764***	0.756***	0.681***	0.616***
	(11.31)	(4.33)	(5.25)	(2.97)	(2.31)	(11.16)	(7.20)	(6.47)	(3.09)	(2.80)
Environmental Performance	0.0433**	0.0555***	0.0391**	0.0486**	0.0239	0.0251	0.0326*	0.0361*	0.0215	0.0228
	(2.34)	(3.21)	(2.03)	(2.26)	(1.08)	(1.41)	(1.74)	(1.93)	(1.14)	(1.14)
Social Performance	0.0137	-0.00360	-0.0193	-0.0101	-0.0275	0.0211	-0.0181	-0.0137	-0.0220	-0.0189
	(0.47)	(-0.14)	(-0.67)	(-0.38)	(-0.82)	(0.85)	(-0.66)	(-0.48)	(-0.72)	(-0.58)
Total Assets		0.377***	0.483***	0.434***	0.438**		0.414***	0.409***	0.326*	0.292
		(3.61)	(4.06)	(3.53)	(2.10)		(3.69)	(3.53)	(1.87)	(1.57)
Equity to Total Assets		0.0142	0.0311	0.0441	0.0296		0.0219	0.0304	0.0117	0.0153
		(0.34)	(1.28)	(1.21)	(0.94)		(0.96)	(1.35)	(0.40)	(0.52)
Net Interest Margin		-0.114**	-0.0958	-0.124***	-0.0855		-0.0835	-0.0925	-0.0596	-0.0667
		(-2.53)	(-1.57)	(-2.98)	(-1.43)		(-1.51)	(-1.60)	(-1.06)	(-1.06)
GDP Growth			-0.0243		-0.0224			-0.0207		-0.0141
			(-1.42)		(-1.22)			(-1.21)		(-0.77)

Inflation			0.00204		0.0131			0.00222		0.00834
			(0.10)		(0.64)			(0.13)		(0.45)
Loan reserves				0.0594	-0.122				-0.257	-0.444
				(0.06)	(-0.08)				(-0.20)	(-0.34)
Non-interest income				-0.629	-0.00424				0.249	0.256
				(-1.51)	(-0.01)				(0.36)	(0.36)
Efficiency ratio				0.584	0.249				-0.180	-0.323
				(0.99)	(0.23)				(-0.18)	(-0.33)
Asset Growth				0.0866	0.0316				-0.0695	-0.0872
				(0.30)	(0.11)				(-0.27)	(-0.33)
Country Environment Score						-0.0163*	-0.00962	-0.0127	-0.0104	-0.0134
						(-1.67)	(-1.28)	(-1.59)	(-1.13)	(-1.36)
Country Social Score						-0.0384***	-0.0222*	-0.0125	-0.0324**	-0.0246
						(-3.16)	(-1.65)	(-0.83)	(-2.33)	(-1.55)
_cons	0.137	-5.321***	-5.927***	-6.193***	-5.745**	1.863**	-3.646**	-4.024**	-2.287	-2.292
	(0.28)	(-3.67)	(-4.60)	(-3.27)	(-2.08)	(2.42)	(-2.04)	(-2.19)	(-0.83)	(-0.77)
N	1208	1142	909	1112	890	966	922	909	903	890
esttype	system	system	system	system	system	system	system	system	system	system

N_g	335	321	297	318	294	315	301	297	298	294
j	12	15	17	19	21	14	17	19	21	23
chi2	211.9	64.08	48.61	74.46	43.73	333.5	92.73	83.57	66.49	57.88
chi2p	1.11e-45	6.64e-12	7.54e-08	6.07e-12	0.0000170	6.28e-70	1.30e-16	1.00e-13	1.44e-09	0.000000275
ar1p	0.0000731	0.0118	0.0175	0.0525	0.0879	0.00139	0.00867	0.0115	0.0477	0.0591
ar2p	0.473	0.899	0.815	0.979	0.950	0.554	0.758	0.782	0.983	0.949
sarganp	0.00365	0.0264	0.00208	0.101	0.000696	0.00701	0.0192	0.00769	0.00377	0.000900
hansenp	0.0355	0.0984	0.0838	0.0348	0.0316	0.0196	0.0969	0.0618	0.107	0.0635

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2 Key findings on Interactions with banks size and country's social & environmental scores

4.2.1 Interaction with bank size

Table 4.2 presents results of estimation with interaction with bank size. Similar to the findings on interaction with country's social and environmental score, average marginal effect graphs, named **Figure 1 to Figure 3** are used to explain the results. While **Model 1** includes interaction between CEP and size controlling for country's social and environmental scores, **Model 2** does not control for the scores. Furthermore, like **Model 1, Model 3** includes interaction between CSP and size controlling for country's social and environmental scores whereas **Model 4** does not control for the scores. As shown in **Figure 1**, results from **Model 1,** shows that corporate environmental performance (CEP) has an insignificant impact to bank stability regardless of the bank size. However, in **Model 2**, where country's social and environmental scores are excluded as control variables, empirical evidence suggest that there exists a negative relationship between corporate environmental performance (CEP) and bank stability for mid-sized banks, but the relationship is insignificant for extremely small and extremely large banks. As for CSP-CFP relationship, consistent with Weber and Oni (2016), our results in **Model 3** and **Model 4** as shown in **Figure 3** reveal that corporate social performance (CSP) has an insignificant impact to bank stability regardless of bank size.

Table 4.2: Estimation with interaction with bank size

	Model 1	**Model 2**	**Model 3**	**Model 4**
Non-performing Loans	0.754***	0.637***	0.785***	0.644***
	(7.71)	(4.32)	(7.62)	(4.22)
Environmental Performance	0.171	0.0834	0.0362*	0.0529***
	(1.00)	(0.64)	(1.80)	(2.99)
Social Performance	-0.0129	-0.00294	0.0654	-0.128
	(-0.47)	(-0.11)	(0.35)	(-0.76)
Country Environment Score	-0.00938		-0.00884	
	(-1.27)		(-1.22)	

Country Social Score	-0.0248*		-0.0211	
	(-1.84)		(-1.59)	
Environmental Performance # Size	-0.0131	-0.00267		
	(-0.82)	(-0.23)		
Total Assets	0.455***	0.388***	0.444***	0.317***
	(3.65)	(3.22)	(3.38)	(2.82)
Equity to Total Assets	0.0222	0.0114	0.0251	0.0124
	(0.97)	(0.27)	(1.06)	(0.27)
Net Interest Margin	-0.0859	-0.111**	-0.0933*	-0.115**
	(-1.59)	(-2.48)	(-1.66)	(-2.51)
Social Performance # size			-0.00749	0.0118
			(-0.44)	(0.79)
_cons	-4.022**	-5.431***	-4.002**	-4.646***
	(-2.21)	(-3.46)	(-2.11)	(-3.16)
N	922	1142	922	1142
esttype	system	system	system	system
N_g	301	321	301	321
j	18	16	18	16
chi2	114.2	70.01	111.4	60.14
chi2p	2.01e-20	1.47e-12	7.46e-20	1.42e-10
ar1p	0.00668	0.0111	0.00817	0.0129

ar2p	0.743	0.897	0.730	0.910
sarganp	0.0282	0.0276	0.0304	0.0132
hansenp	0.0666	0.0720	0.103	0.0559

t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

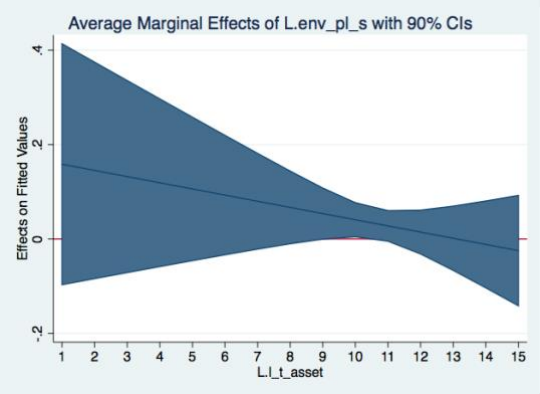

Figure 1

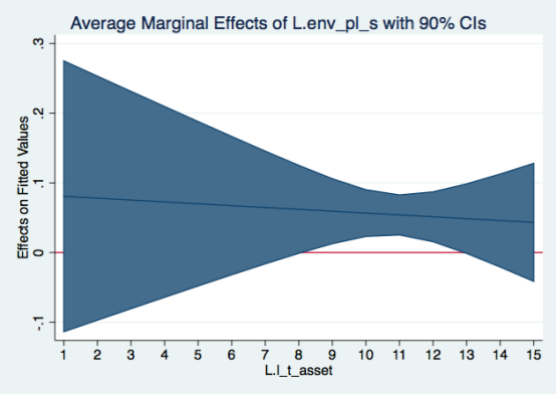

Figure 2

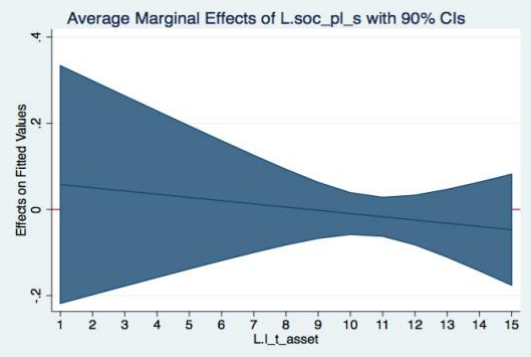

Figure 3

4.2.2 Interaction with country's social & environmental scores

Results shown in **Tables 4.3**, **Model 1 to Model 6** are better interpreted using the average marginal effect graphs, named **Figure 1 to Figure 8.** While **Model 1** includes only interaction between CEP and country environmental score, **Model 2** includes only interaction between CSP and country social score. **Model 3** includes both interactions. Similar pattern is used in **Model 4 – Model 6.** However, unlike **Model 1 – Model 3,** the last three models control for bank specific variables such as total assets, equity to total asset ratio and net interest margin. As shown in **Figure 1**, results from **Model 1,** shows that corporate environmental performance (CEP) has an insignificant impact to bank stability in countries with poor environmental scores and positive significant impact (to bank stability - proxied by non-performing loans) in

countries with good environmental scores. On contrary, depicting **Model 2**, **Figure 2** shows that corporate social performance (CSP) has an insignificant impact to bank stability regardless of a country's social score. Similar sentiments are found in **Model 3**, as shown in **Figure 3** and **Figure 4.** Similarly, results from **Model 4** as they appear in **Figure 5,** shows that the effect of corporate environmental performance (CEP) to bank stability is insignificant impact in countries with poor environmental scores and positive significant impact (to bank stability) in countries with good environmental scores. However, representing **Model 5**, **Figure 6** shows that corporate social performance (CSP) has an insignificant impact to bank stability regardless of a country's social score. Similar sentiments are found in **Model 6**, as shown in **Figure 7** and **Figure 8.** For the CEP-CFP relation, our results are consistent with Weber and Oni (2016) for countries with poor environmental score and in line with (Soana, 2009; Nollet, Filis, and Mitrikostas, 2016) for countries with better environmental scores. On the other hand, for CEP-CFP nexus, our results support those reached by Weber and Oni (2016) who found no significant relationship between CSP and bank stability. One possible explanation for this could be banks that operate in countries that already have higher social and environmental scores might be overdoing their sustainable practices to the extent that there is no more value addition.

Table 4.3: Estimation with interaction with Country Environment and Social Scores.

	Model 1	**Model**	**Model 3**	**Model 4**	**Model**	**Model 6**
Non-performing Loans	0.880***	0.882***	0.880***	0.755***	0.767***	0.758***
	(11.11)	(11.22)	(11.14)	(6.91)	(7.26)	(6.97)
Environmental Performance	-0.0768	0.0248	-0.0799	-0.123*	0.0322*	-0.123**
	(-1.32)	(1.39)	(-1.39)	(-1.94)	(1.71)	(-1.96)
Social Performance	0.0202	0.0319	0.0388	-0.0204	0.00713	0.0103
	(0.81)	(0.19)	(0.24)	(-0.75)	(0.04)	(0.06)
Country Environment Score	-1**	-0.0161	-0**	-0.0211**	-60	-0.0210**
	(-2.25)	(-1.63)	(-2.23)	(-2.36)	(-1.29)	(-2.36)
				-0.0243*	-0.0200	-0.0216

Country Social Score	-5***	-4*	-8**			
	(-3.26)	(-1.93)	(-1.97)	(-1.83)	(-0.99)	(-1.08)
Bank EP # Country EP	0.00248*		0.00255*	0.00377**		0.00376**
	(1.73)		(1.79)	(2.48)		(2.50)
Bank SP # Country SP		-214	-373		-495	-0.000608
		(-0.07)	(-0.12)		(-0.14)	(-0.18)
Total Assets				0.429***	0.417***	0.433***
				(3.85)	(3.66)	(3.83)
Equity to Total Assets				0.0235	0.0211	0.0228
				(1.04)	(0.91)	(0.99)
Net Interest Margin				-0.0833	-0.0824	-0.0823
				(-1.49)	(-1.47)	(-1.46)
_cons	2.243***	1.806*	2.156**	-3.250*	-3.782*	-3.426*
	(2.92)	(1.68)	(2.01)	(-1.84)	(-1.90)	(-1.73)
N	966	966	966	922	922	922
esttype	system	system	system	system	system	system
N_g	315	315	315	301	301	301
j	15	15	16	18	18	19
chi2	323.9	350.5	338.0	99.51	94.13	100.4
chi2p	6.18e-67	1.21e-	4.46e-69	1.97e-17	2.40e-	4.43e-17

ar1p	0.00142	0.00145	0.00147	0.0101	0.00864	0.0101
ar2p	0.551	0.554	0.552	0.776	0.758	0.776
sarganp	0.00785	0.00740	0.00830	0.0274	0.0175	0.0253
hansenp	0.0214	0.0187	0.0202	0.124	0.0976	0.126

t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

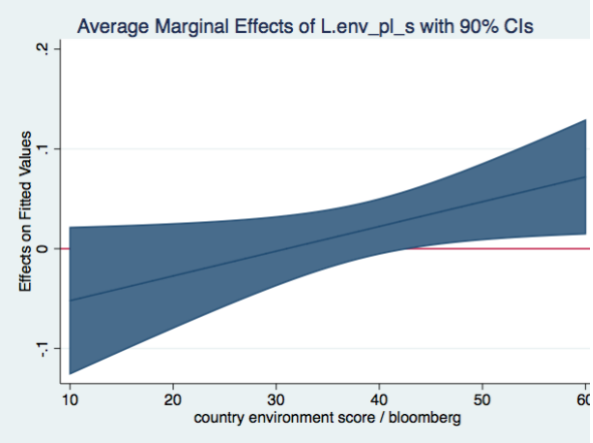

Figure 1

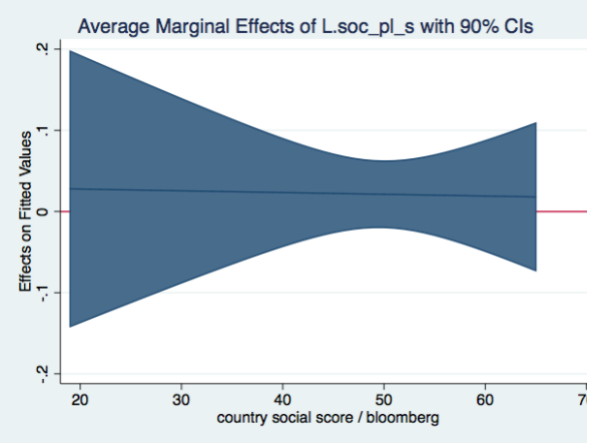

Figure 2

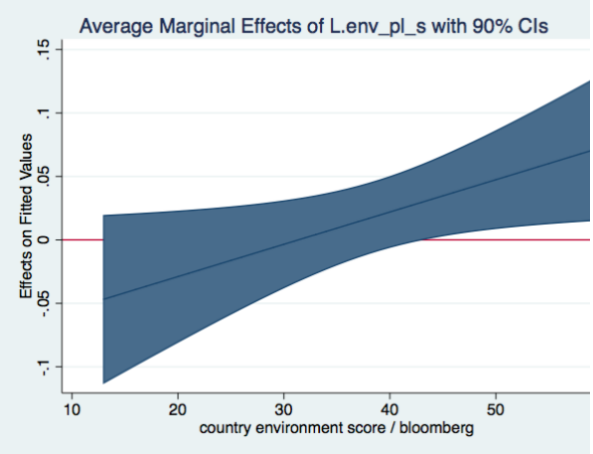

Figure 3

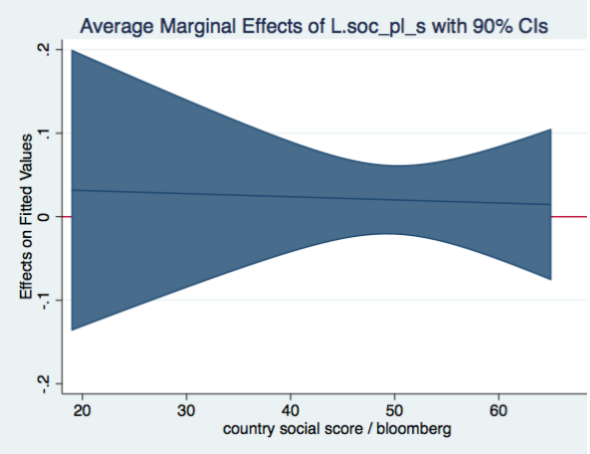

Figure 4

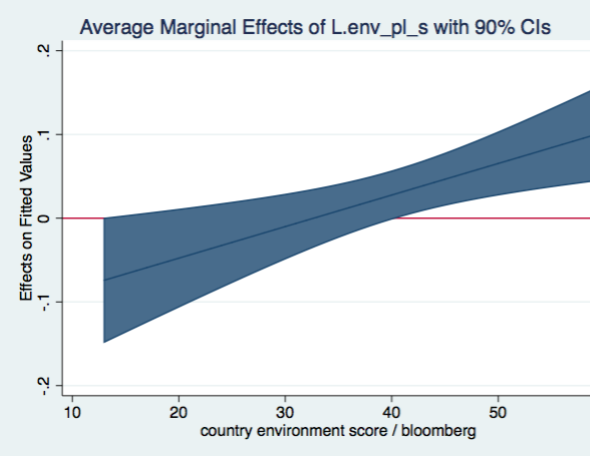

Figure 5

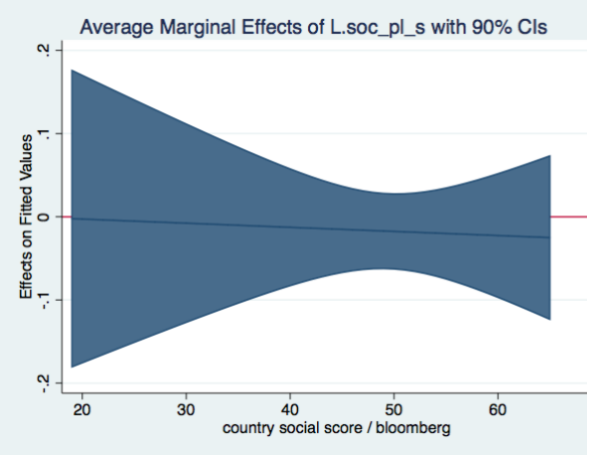

Figure 6

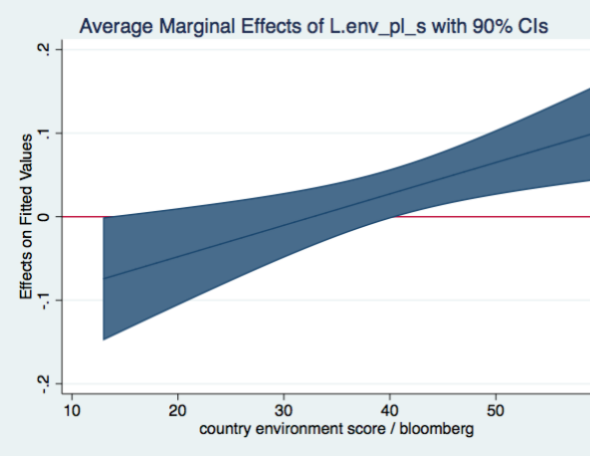

Figure 7

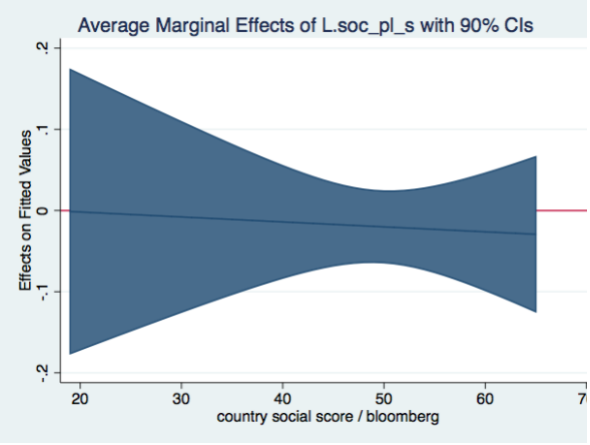

Figure 8

4.2.3 Key findings on Financial product safety (CSP)-CFP relation

Table 4.4 presents results of estimation with financial product safety as a mediator for corporate social performance (CSP) effect to corporate financial performance (CFP). While **Model 1-Model 5** shows empirical results without controlling for country's social and environmental scores, **Model 6-Model 10** controls for country's social and environmental scores. **Model 1 and Model 6** does not include any control variables. **Model 2 and Model 7** controls for three bank specific variables namely, total assets, equity total asset ratio, and net interest margin. Besides, **Model 3 and Model 8** adds on macro-economic variables i.e. inflation and GDP growth. While **Model 4 and Model 9** only controls for all bank specific variables, **Model 5 and Model 10** includes macro-economic variables as well. Findings from **Table 4.4** indicates that there is a significant negative relationship between corporate social performance (CSP) aspect of financial product safety and non-performing loans (proxy for

bank stability) in models that control for country's social and environmental scores. For example, in **Model 9**, 1% increase in the level of financial product safety will decrease non-performing loans by 0.0335%. This finding suggests that as banks can improve their stability by enhancing safety of their financial products, being more transparent to their clients and abstaining from selling products for which clients will be worse off having acquired them.

Table Social 4.4: Financial Product Safety

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Non-performing Loans	1.028***	0.643***	0.694***	0.555	0.602	-0.127	-0.181	-0.259	-0.303	-0.510*
	(11.96)	(3.18)	(3.17)	(1.57)	(1.47)	(-0.53)	(-0.67)	(-0.92)	(-1.16)	(-1.94)
Environmental Performance	0.0281	0.0324	0.0389	0.0254	0.0273	0.0618***	0.0593**	0.0669***	0.0707**	0.0848***
	(1.09)	(1.23)	(1.39)	(0.87)	(0.93)	(2.76)	(2.51)	(2.72)	(2.48)	(2.81)
Social Performance	0.00667	-0.0228	-0.0223	-0.0296	-0.0313	-0.0275**	-0.0306***	-0.0268**	-0.0335**	-0.0266*
	(0.38)	(-1.43)	(-1.33)	(-1.48)	(-1.53)	(-2.49)	(-2.92)	(-2.50)	(-2.53)	(-1.93)
Total Assets		0.478***	0.517***	0.562**	0.615**		-0.109	-0.147	-0.0584	-0.196
		(2.89)	(3.01)	(2.04)	(2.05)		(-0.52)	(-0.66)	(-0.17)	(-0.52)
Equity to Total Assets		0.0236	0.0367	0.0228	0.0237		0.00290	0.0291	-0.00176	0.0174
		(0.55)	(1.02)	(0.46)	(0.63)		(0.12)	(1.20)	(-0.07)	(0.64)
Net Interest Margin		-0.117	-0.163	-0.0827	-0.0835		-0.196***	-0.268***	-0.188***	-0.286***

	(-1.41)	(-1.61)	(-0.91)	(-0.77)		(-2.83)	(-3.72)	(-2.79)	(-3.60)
GDP Growth		-0.0160		-0.0205			-0.000275		-0.00388
		(-0.81)		(-0.92)			(-0.02)		(-0.23)
Inflation		0.0181		0.0271			0.0413***		0.0425**
		(0.68)		(1.26)			(2.65)		(2.06)
Loan reserves			-0.227	-0.203				0.180	-0.187
			(-0.16)	(-0.14)				(0.11)	(-0.12)
Non-interest income			0.355	0.715				-0.0898	-0.121
			(0.68)	(1.10)				(-0.20)	(-0.25)
Efficiency ratio			0.663	0.703				-0.360	-0.264
			(0.59)	(0.57)				(-0.50)	(-0.37)
Asset Growth			0.238	0.219				0.166	0.0306
			(0.79)	(0.60)				(0.43)	(0.08)
Country					-0.185***	-0.234***	-0.231***	-0.245***	-0.256***

Environment Score										
						(-3.67)	(-3.41)	(-2.84)	(-3.23)	(-2.74)
Country Social Score						0.00339	0.0145	0.0282*	0.0152	0.0296
						(0.33)	(1.15)	(1.73)	(1.01)	(1.38)
_cons	-0.0726	-6.053***	-6.238***	-7.554**	-7.996**	2.951*	5.993	5.150	5.502	6.035
	(-0.17)	(-4.05)	(-3.82)	(-2.51)	(-2.37)	(1.70)	(1.62)	(1.26)	(1.14)	(0.99)
N	790	765	725	756	716	763	738	725	729	716
esttype	system	system	system	system	system	system	system	system	system	system
N_g	320	306	293	303	290	311	297	293	294	290
j	12	15	17	19	21	14	17	19	21	23
chi2	299.6	15.73	24.61	15.69	23.43	35.76	38.06	43.94	36.81	41.12
chi2p	1.19e-64	0.0153	0.00181	0.109	0.0243	0.0000010 6	0.0000073 3	0.0000033 7	0.000240	0.000170
ar1p	0.000864	0.0988	0.104	0.309	0.337	0.274	0.235	0.171	0.109	0.0282
ar2p	.	.	.	.	.	.	.	.	.	.
sarganp	0.000037 7	0.000821	0.00702	0.00745	0.0127	0.613	0.676	0.166	0.671	0.148
hansenp	0.000137	0.0682	0.101	0.123	0.122	0.257	0.312	0.0680	0.506	0.169

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4.5 presents findings for interaction between financial product safety (a component of CSP) and country's social and environmental scores. **Model 1 to Model 6** are better interpreted using the average marginal effect graphs, named **Figure 1 to Figure 4.** While **Model 1** includes only interaction between CEP and country environmental score, **Model 2** includes only interaction between financial product safety and country social score. **Model 3** includes both interactions. Similar pattern is used in **Model 4 – Model 6.** However, unlike **Model 1 – Model 3,** the last three models control for bank specific variables such as total assets, equity to total asset ratio and net interest margin. As shown in **Figure 1**, results from **Model 2,** shows that financial product safety has an insignificant impact to bank stability in countries with poor social scores and extremely good social scores. However, for countries with intermediate social scores, there exist a negative relationship between financial product safety and bank stability. Similar findings can be observed in **Model 3, Model 5** and **Model 6** as it appears in **Figure 2, Figure 3** and **Figure 4** respectively. A possible explanation for this is that for countries with very poor social scores, there is little value perceived from adoption or embracement of sustainable practices hence it is unlikely that it translates to enhanced bank stability. Moreover, for countries with very good social scores, banks that enhance their financial product safety as an element of CSP might be overdoing their sustainable practices to the extent that there is no more value increment.

Table 4.5: Financial Product Safety interaction with country Environmental and Social scores

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Non-performing Loans	-0.104	-0.103	-0.0790	-0.141	-0.164	-0.126
	(-0.44)	(-0.41)	(-0.32)	(-0.52)	(-0.61)	(-0.47)
Environmental Performance	-0.162	0.0585**	-0.158	-0.121	0.0553**	-0.118
	(-1.61)	(2.50)	(-1.60)	(-1.21)	(2.29)	(-1.19)
Social Performance	-0.0289***	-0.0705	-0.0761	-0.0319***	-0.0846	-0.0898
	(-2.63)	(-1.01)	(-1.13)	(-3.06)	(-1.26)	(-1.36)
Country Environment Score	-0.194***	-0.187***	-0.197***	-0.235***	-0.243***	-0.245***

	(-3.84)	(-3.70)	(-3.87)	(-3.37)	(-3.55)	(-3.53)
Country Social Score	0.000656	-0.00209	-0.00559	0.0106	0.00780	0.00350
	(0.06)	(-0.15)	(-0.39)	(0.80)	(0.52)	(0.22)
Bank EP # Country EP	0.00531**		0.00514**	0.00429*		0.00413*
	(2.14)		(2.08)	(1.74)		(1.68)
Bank SP # Country SP		0.000903	0.000995		0.00113	0.00121
		(0.64)	(0.73)		(0.83)	(0.91)
Total Assets				-0.0541	-0.125	-0.0756
				(-0.25)	(-0.62)	(-0.37)
Equity to Total Assets				0.00468	0.00210	0.00357
				(0.19)	(0.09)	(0.15)
Net Interest Margin				-0.190***	-0.196***	-0.191***
				(-2.66)	(-2.93)	(-2.77)
_cons	3.611**	3.428*	4.122**	5.840	6.943*	6.898*
	(2.04)	(1.77)	(2.13)	(1.57)	(1.84)	(1.81)
N	763	763	763	738	738	738
esttype	system	system	system	system	system	system
N_g	311	311	311	297	297	297

j	15	15	16	18	18	19
chi2	37.76	36.83	38.85	38.28	39.37	39.49
chi2p	0.000001205	0.000001905	0.000002009	0.000015507	0.000009807	0.000020907
ar1p	0.282	0.330	0.341	0.273	0.258	0.296
ar2p	.	.	.	.	.	.
sarganp	0.548	0.613	0.550	0.643	0.683	0.653
hansenp	0.284	0.341	0.379	0.345	0.428	0.474

t statistics in parentheses * $p <$ 0.1, ** $p < 0.05$, *** $p < 0.01$

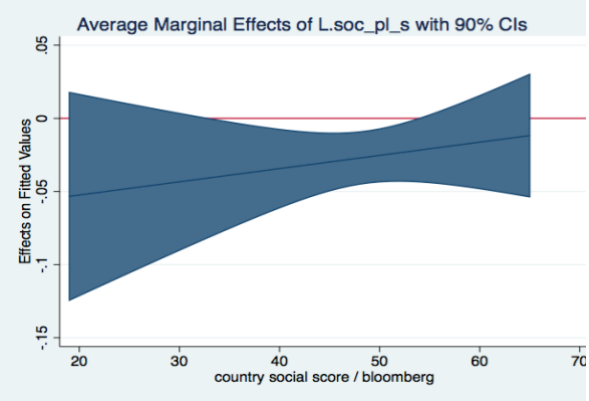

Figure 1

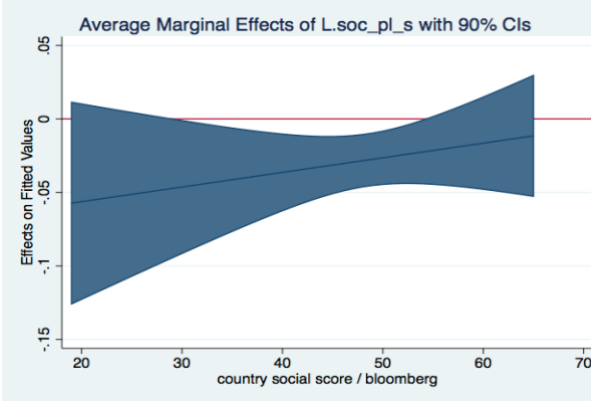

Figure 2

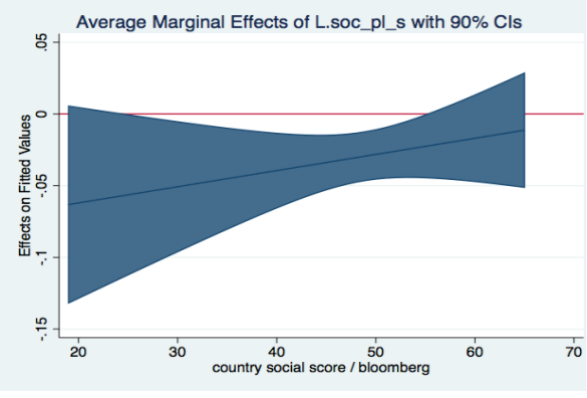

Figure 3

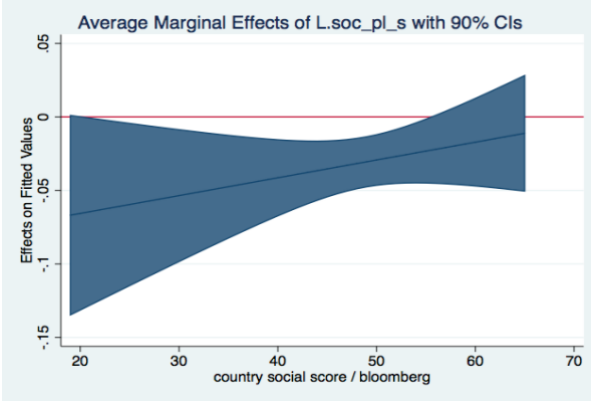

Figure 4

5.0 Conclusion and Policy Recommendations

In the past decade, adoption of sustainable social and environmental practices by banks and other financial institutions has been one of the most significant trends in the financial market. This study investigates the impact of such adoption to bank's stability. More specifically, we examine the effect of corporate social performance (CSP) and corporate environmental performance (CEP) to bank's stability. While the focus in most of the existing literature has been testing the relationship between sustainability and banks financial performance using profitability measures such as returns on assets (ROA) and return on equity (ROE), little is known about the effect of adopting sustainable practices to the stability of the bank. As such this study has expanded the understanding of the relationships between sustainability performance and economic indicators. This study employed numerous empirical models in examining the contribution of social and environmental sustainability towards stability of banks. In our analysis, we have controlled for both bank-specific variables and macro-economic variables. Inclusion of an interaction term in this study also helps to understand whether there is any variation of the impact of corporate social performance (CSP) and corporate environmental performance (CEP) to bank stability (BS) across banks with different sizes and countries with different social and environment scores. Moreover, since there has been a growing evidence attempting to see the relationship between product safety and corporate social performance (Boileau, 2016; Epuran et al., 2018), our study has presented new evidence from the banking industry on whether if product safety can be a channel through which banks corporate social performance (CSP) affect corporate financial performance (CFP). The main findings can be categorized into three main points. *Firstly*, in line with (Soana, 2009; Nollet, Filis, and Mitrikostas, 2016), we report that corporate environment performance (CEP) is positively linked to bank stability proxied by non-performing loans (NPL). A rationale for this could be resources used to enhance CEP could have been channelled to credit monitoring and loan collection follow up which reduces non-performing loans (Aswaf, Bogale & Teame, 2016) and enhances bank stability. On contrary, consistent with Weber and Oni (2016), our results suggest no significant relationship between corporate social performance (CSP) and bank stability. *Secondly,* results from models with interaction with country's sustainability scores reveal that corporate environmental performance (CEP) has an insignificant impact to bank stability in countries with poor environmental scores and positive significant impact (to bank stability – proxied by non-performing loans) in countries with good environmental scores. We argue that banks that operate in countries with already higher social and environmental

scores might be overdoing their sustainable practices to the extent that there is no more value addition. On the other hand, corporate social performance (CSP) has an insignificant impact to bank stability regardless of a country's social score. Accounting for the variation in terms of bank size, our results suggest that there exists a negative link between corporate environmental performance (CEP) and bank stability for mid-sized banks, but the relationship is insignificant for very small and very large banks. *Thirdly,* we report that financial product safety as an aspect of corporate social performance (CSP) is positively related to banks stability. This suggest that banks can be more stable if they improve safety of their financial products, enhance transparency to their clients and refrain from selling products for which clients will be worse off having acquired them.

Findings from this study have significant implications to market investors, bankers and regulators. Market investors and analysts will have better understanding of how bank stability can be affected by social and environmental sustainability. This can be incorporated in the valuation of banks financial performance. Furthermore, investors who are interested in banking industry are incentivized to invest in banks that are transparent in their products as this translates to their better stability. As for bankers, caution should be taken in embracing environmental sustainability as our empirical evidence suggest non-performing loans increase as the CEP raises. On the other hand, banks are encouraged to improve their CSP since enhancement of CSP does not adversely impact bank stability. Finally, for regulators, incentive structure could be explored to encourage banks to embrace social sustainability practices as this will improve the overall stability of the banking sector. This could be done by imposing tax on socially and environmentally harmful products or services; specifying a percentage of greenery compulsory in financing development projects; and providing tax deductions for socially and environmentally friendly initiatives (Nizam et al., 2019). With these incentives and if allowed to operate in a favourable political and economic environment which offers a level playing field and profit-making prospects, financial sector can be a significant contributor to the economy (Ng, 2016). Despite providing valuable insights on the sustainability-bank stability nexus, our study does not provide the channel through which CEP affects positively the non-performing loans. This study could be extended by adding the data period, using granger-causality test to study the link between social and environmental sustainability performance and determinants of bank performance, and where data is available, include the governance aspect of sustainability performance.

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Role of Knowledge in the Transition to Circular Economy: A Sustainability and Sharia Perspectives

Salah Gueydi

Abstract

Pursuing sustainability and converging to Circular Economy (CE) are fully synchronized with Sharia principles. However, the transition to CE is a difficult and lengthy process. It requires a fundamental change in the behavior of all relevant stakeholders, particularly consumers and producers.

Knowledge is key in succeeding this transition and addressing the challenge of making it profitable or, at least, economically viable. Knowledge has to be seen as an economic resource or a factor of production with very particular characteristics compared to material resources.

From Sharia perspective, gaining (beneficial) knowledge is highly encouraged. Using knowledge to converge to CE is fully in line with Sharia principles.

Key words: Circular, Linear, Economy, Sustainability, Knowledge, Sharia

1. Introduction

Historically, industrial nations were able to access input resources in colonized nations at low costs and with no (or very little) restrictions. This uneven distribution: abundant and low cost natural resources in colonized areas versus abundant financial resources and technology in industrial nations resulted in an economic model that focuses on profitability and cost efficiency rather than on the reasonableness of use of raw materials, the ability to reuse or recycle wastes or the understanding and willingness to address environmental issues, etc.[43]. The linear economy prevailing so far is a direct consequence of this model.

Linear economy has resulted in depleted resource reserves, increased pollution, degraded environment and lower quality of life. The take – make – use – dispose model, on the basis of which the linear economy operates, is not sustainable.

The alternative should be sought in an economic model whereby inputs to the industrial process (raw materials, energy, consumables, etc.) are reduced, outputs are reused and wastes are

[43] Furkan Sariatli, Linear Economy Versus Circular Economy: A Comparative and Analyzer Study For Optimization of Economy For Sustainability, Visegrad Journal on Bioeconomy and Sustainable Development, Volume 6, 2017, no. 1, pp 31-34.

recycled. These actions (Reduce – Reuse – Recycle) are the three pillars of the circular economy[44].

Because the two models are very different from each other, the transition from linear economy to circular economy will not be easy. It will require a fundamental change of behavior not only from producers who need to be mindful to the environment while choosing their raw materials, processes, energy sources, packaging, etc. but also from consumers who need to adjust their preferences by, for instances, preferring durability, energy efficiency, lower environment impact, etc. to comfort.

However, the transition to circular economy can be made easier if it makes sense from an economic point of view i.e. where a certain return on investment is achieved[45] and neither the producers nor the consumers have to compromise on the quality of the output or the level of growth or profitability. The products and services as well as the processes will need to be redesigned in such a way that resources are used efficiently, outputs are produced at better quality and wastes are minimized and re-integrated in the production process in a loop fashion. Knowledge and innovation are key in succeeding this kind of transition. Gaining more knowledge on the inputs, outputs and production process as well as being innovative are the way to achieve it. In this sense, knowledge becomes the main tool to make circular economy a viable alternative to linear economy.

This does not mean, however, that knowledge is not part of linear economy. The integration of knowledge in the economic process (knowledge intensity) is already very high[46]. So high that knowledge is now regarded as an economic resource in its own right and with its own properties, and the economy that uses it is called "Knowledge Economy" (KE).

The purpose of this paper is to explore to what extent, and under what conditions, knowledge can offer an appropriate tool to the transition to Circular Economy (CE). In addition, a review of the concepts of knowledge and sustainability will be made from a Sharia perspective in order to see to what extent the use of knowledge in promoting (or converging to) CE is consistent with Sharia Maqasid and principles.

[44] Julian Kirchherr et al, Conceptualizing the circular economy: An analysis of 114 definitions, Journal of Resources, Conservation & Recycling, 127 (2017)

[45] P. Ghisellini et al. A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production 114 (2016) pp 11 to 32

[46] John Houghton and Peter Sheehan, A Primer on the Knowledge Economy, CSES Working Paper No. 18, February 2000, accessible at: https://core.ac.uk/download/pdf/10826008.pdf

Hence, the paper will try to address the following two questions: (i) What role can knowledge play in the transition to CE? and (ii) What is the Sharia stand on this role?

To do so, section 2 will provide a presentation of the concepts of CE and KE. Section 3 will focus on the place of knowledge in CE and the link between knowledge, KE and sustainability. Section 4 will present the case of biomimicry as an illustration of this link. Section 5 will discuss knowledge and sustainability from Sharia perspective. Section 6 will be a concluding one.

2. Relevant concepts

2.1.Circular Economy

CE is a concept that has witnessed a growing interest. In 2016 alone, more than 100 peer reviewed articles were published on the topic, compared to only about 30 articles in 2014[47].

CE has generally been defined around a number of core activities that describe how it can be achieved. These activities are often referred to as the R frameworks; the most prominent one being the 3 R framework: Reduce, Reuse and Recycle, which is used in China's 2008 Law on Circular Economy Promotion[48]. The 2008 European Union (EU) Waste Framework Directive[49] added to this framework the Recover activity, which refers to the case where the waste is used to serve 'a useful purpose by replacing other materials'[50]. Furthermore, other activities were added to the framework. The most exhaustive R framework, as reported by J. Kirshherr et al[51], is the 9 R framework illustrated in figure 1 below:

[47] Julian Kirchherr et al, Conceptualizing the circular economy: An analysis of 114 definitions, Journal of Resources, Conservation & Recycling, 127 (2017)

[48] Idem

[49] European Commission, 2008. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on Waste and Repealing Certain Directives. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=%20CELEX:32008L0098&from=EN

[50] EU Commission, Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste, available at: http://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf

[51] Julian Kirchherr et al, Conceptualizing the circular economy: An analysis of 114 definitions, Journal of Resources, Conservation & Recycling, 127 (2017)

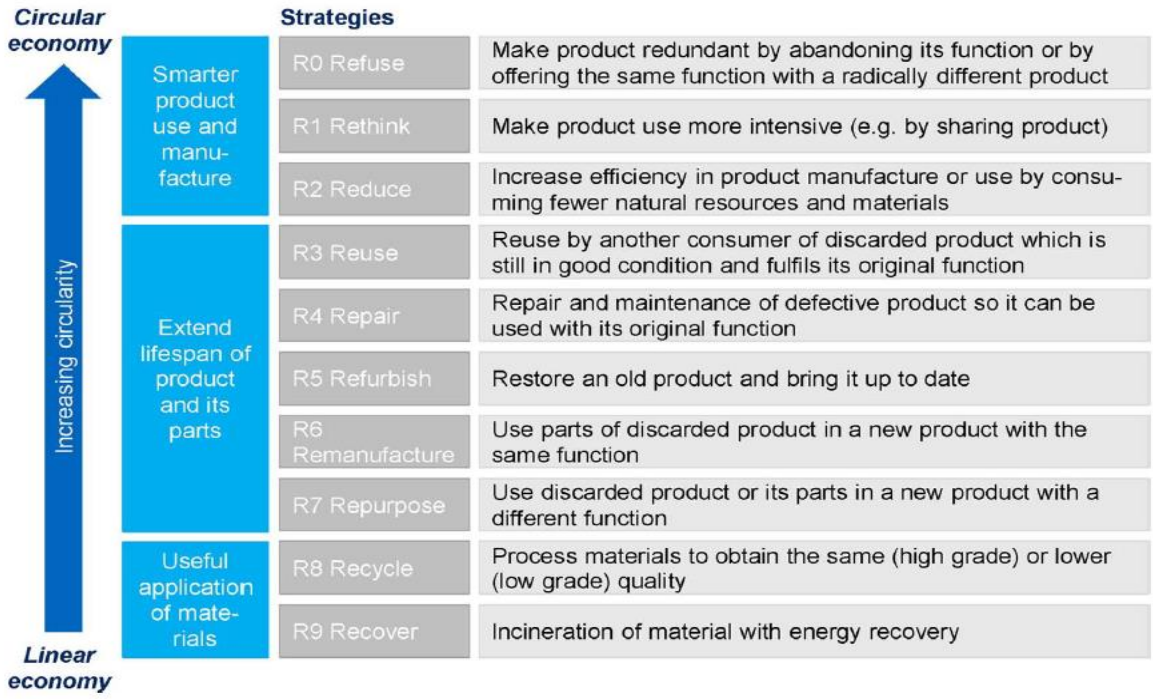

Figure 1: 9 R Framework

Moreover, J. Kirshherr et al[52], who reviewed 114 definitions of CE in different papers and reports and developed a coding system to analyze and compare these definitions, propose the following definition of CE: "*A circular economy describes an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations*."

On the basis of this definition, the following components of the CE concept can be identified:

- Activities: the 4 R framework used in the EU Directive (Reduce, Reuse, Recycle, Recover) with a particular focus on the Reduce action as shown by the use of the term '*alternatively'* after the term '*reducing'*,

[52] Idem

- Modality of change: a system perspective[53]/dimension embedded in the term "*replace"* (as opposed to adapt or enhance), which suggests that achieving CE would require a systemic shift in business models as opposed to gradual changes thereto[54],
- Scope: three levels are involved: Micro (individual entities), Meso (groups and groups of groups) and Macro (regional, national scales) levels;
- Aim: achieve sustainable development, which allows environmental quality, economic prosperity and social equity for current and future generations. These same three dimensions (environment, economy and social) were identified by Ghisellini et al (2016)[55] as areas that need consideration (in addition to technology) to achieve sustainability of an economy or a sector.

2.1 Knowledge Economy

KE can be defined as an economic structure where knowledge plays a key role both as a factor of production and a determinant of skills, learning and innovation[56].

Aberkane[57] (2015) identifies the following properties and laws governing exchange of knowledge:

- Prolificity. Knowledge is growing at an exponential rate. This prolificity can be measured by the increase of the list of newly solved problems. It is estimated that this list currently doubles every 5 to 7 years[58].
- Collegiality. Knowledge thrives and expands when shared. It is in the interest of all that knowledge is made available without barriers. Wikipedia is the perfect illustration.

[53] Idem

[54] Idem

[55] P.Ghisellini et al. A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production 114 (2016) pp 11 to 32

[56] John Houghton and Peter Sheehan, A Primer on the Knowledge Economy, CSES Working Paper No. 18, February 2000, accessible at: https://core.ac.uk/download/pdf/10826008.pdf

[57] Idriss J. Aberkane. A simple paradigm for nooconomics, the economy of knowledge. CS-DC'15 World e-conference, Sep 2015, Tempe, United States. CS-DC'15 World e-conference. <hal-01291105>

[58] Idem

- Positive sum game. Unlike exchange of material goods and commodities, the exchange of knowledge is not a zero-sum game. Both parties of an exchange benefit or at least do not lose anything in the exchange. This is perfectly illustrated by Aberkane in what he calls Soudoplatoff's law, which says that "*when one shares a material good, one divides it. When one shares an immaterial good, one multiplies it*[59]". This property is extremely important if we consider knowledge as an economic resource or factor of production. It would mean that growth is not bound by the limited quantum of resources. It will be limitless in the same way as the resource (knowledge) is limitless. It would also mean that laws that govern material economics such as scarcity or diminishing returns will not apply to KE.
- Super-linearity. Unlike material assets which add to each other in a linear fashion (1,000 units of a product added to an inventory of the same product of 1,000 units increase the inventory to 2,000 units), compositions (i.e. bits) of knowledge add to each other in a different way. Adding a knowledge A to a knowledge B will result in a knowledge C, which is more than knowing A and B separately ($K(A \wedge B) > K(A) \wedge K(B)$). C can be anywhere between a trivial (but additional) knowledge to a truly revolutionary one[60].
- Non-instantaneousness. Exchange of material commodity is instantaneous. It takes only the time of a signature to make it regardless of the quantity or value exchanged. However, exchange of knowledge takes time, which makes such an exchange a flow rather than a stock.
- Time and attention bound. The exchange of knowledge takes time and needs attention. If any of these two lacks, the flow of knowledge exchanged will be nil. Aberkane expresses this property with the following intuitive equation: $\varphi(k) \propto At$[61], which reads as follows: the flow of knowledge exchanged is proportional to attention (A) multiplied by time (t). If any of these two factors is nil, the flow is nil.

[59] Idem

[60] Idem

[61] Ibid.

3. Knowledge, CE and sustainability

With the properties and laws identified above, knowledge can be the vector through which the transition to circular economy can be achieved. It is through knowledge that the challenge of reintegrating wastes into production processes in an economically and environmentally sustainable fashion can be won. Aberkane[62] expressed this fact through the following equation: *waste + knowledge = asset*.

He also referred to the concept of *blue economy* introduced by Gunter Pauli[63] as the next level that CE should aspire to attain to achieve sustainability. He argues that because "Blue Economy" is profitable in itself, as it is inspired from a waste-free, cheap and effective industrial system, namely nature, it shouldn't be unreasonable to seek production systems that are both pollution-free and more competitive than the current systems[64].

Blue economy would then be an enhanced version of CE that uses knowledge, and more importantly, nature as a source of inspiration to achieve sustainable development while being economically viable. A typical illustration of this effort can be seen in a number of products and models that try to emulate natural phenomena to address specific issues. This trend is referred to as "biomimicry".

4. Illustration of the link between knowledge and CE

The case of biomimicry

The concept of biomimicry was introduced in 1997 by the US biologist Janine Benyus[65]. It consists of learning and getting inspiration from forms, processes and ecosystems that are available in nature in order to address design issues and sustainability challenges by replicating them.

62 Idriss J. Aberkane. From waste to kwaste: on the Blue Economy in terms of knowledge flow. CS-DC'15 World e-conference, Sep2015, Tempe, United States. CS-DC'15Worlde-conference. <hal-01291106>

63 Pauli, G.A. (2010). The blue economy: 10 years, 100 innovations, 100 million jobs (Paradigm Publications).

64 Idriss J. Aberkane. From waste to kwaste: on the Blue Economy in terms of knowledge flow. CS-DC'15 World e-conference, Sep2015, Tempe, United States. CS-DC'15Worlde-conference. <hal-01291106>

65 Benyus, J.M. (2009). Biomimicry (HarperCollins).

There are three levels in biomimicry: (i) copying forms and shapes, (ii) copying processes such as photosynthesis in a leaf and (iii) copying an ecosystem, such as building a nature-inspired city[66]. The process of biomimicry involves the following steps[67]:

- identify the problem that needs to be solved;
- interpret or 'biologise' the problem by asking the question of how nature addresses the issue.
- Discover/find the solution to the problem in nature (i.e. answer the previous question).
- abstract or understand the principles and context of the solution and select a shortlist of possible options.
- emulate the solution discovered.
- evaluate the solution and identify areas of improvement to the design.

Many examples of success stories can be mentioned, including the following:

4.1 Water filtering and water distribution

Access to clean water is one of the 17 Sustainable Development Goals (SDGs)[68]. Allah SWT allowed a number of animals and plants in nature to brilliantly master the process of cleaning or filtering water. Hence, mangroves (small trees growing on coastal saline waters) are able to filter out the salt from the water that enters their roots. The excess salt is excreted through glands in their leaves or concentrated in older leaves or bark[69]. This explains why mangroves can live in water that is up to 100 times saltier than most other plants can tolerate.

Similarly, Baleen whales, a variety of whales that has no teeth, are able to filer water using a keratinous row of fibers (like hair), known as baleen (see figures 2(a) and (b)). When the whale's mouth is closed, the lower jaws distends, creating pressure against the baleen, which forces water through the keratin fibers and retains all organic material[70].

[66] South African Water Research Commission, The Water Wheel November/December 2014

[67] idem

[68] UN Resolution A/RES/70/1 - Transforming our world: the 2030 Agenda for Sustainable Development - available at: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[69] South African Water Research Commission, The Water Wheel November/December 2014.

[70] Idem

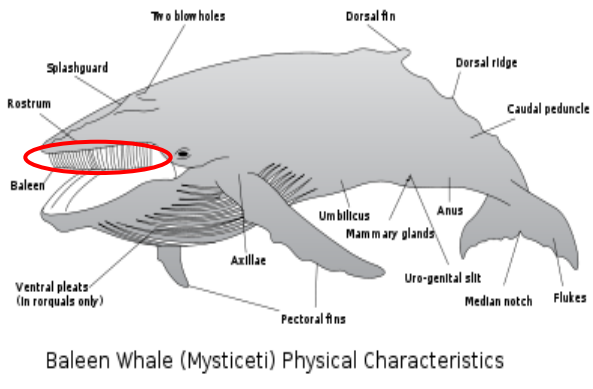

Figure 2(a): Baleen whales physical characteristics; *Figure 2(b): Baleen whale's upper jaw showing the baleen.*

Source: Google.com

Interestingly, Baleen filters is now a biomimetic technology used to filter water. Water runs through the filter, causing visible solids and particles to remain behind in the filter. A second high-pressure, low-volume, spray of water is then used to remove the solids and carries it away[71].

Another example of successful emulation of a natural water-related process is the use of aquaporins, a membrane protein omnipresent among all living organisms, allowing water to pass through cell walls. The protein contains pores made of crystalline material that are used to transport water in and out of cells. Aquaporins allow transport of water at a rate much faster than diffusion. A Danish firm, also called Aquaporin, was able to mimic this process by using a forward system incorporating aquaporins to increase water transport rate. Aquaporins are embedded into artificial membranes simulating the natural behaviour of biological membranes[72].

[71] Idem

[72] Idem

4.2 Improving the performance of turbines and fans

Another example from whales is the tubercles on humpback whales' flippers. The very particular shape of these flippers (see figure 3) allows the whales to swim very agilely despite their very heavy weight (36 tons)[73].

Figure 3: Humpback whale pectoral fin[74]

The tubercles (ridges on the edge of the flippers) act as a passive flow control and improves the performance and maneuverability of the flippers[75].

Many structures, such as wings of airplanes and fan and turbine blades were inspired from the humpback whales' flippers resulting in significant improvements (see Figures 4(a) and 4(b)). Hence, applying this concept to wind turbine blades resulted in reducing drag and noise and increasing speed to changing wind direction by almost 25 percent. The power harnessed increased by 20%[76].

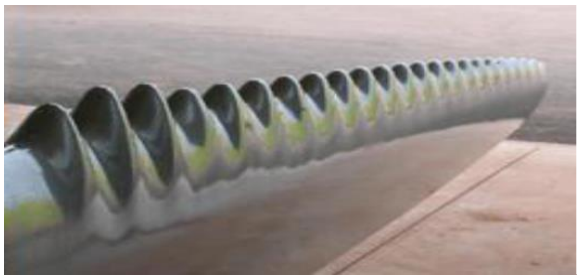

Figure 4(a): A prototype of a wind turbine blade[77]

[73] K.Z. Ivanić al. Biomimicry – An Overview, The Holistic Approach to Environment 5(2015)1, 19-36, available at: https://hrcak.srce.hr/136003

[74] Idem

[75] Idem

[76] Idem

[77] Idem

Figure 4(b): Industrial ceiling fan - model "Altra Air"[78]

Similarly, when the same concept is used on fans, it resulted in better performance and significant energy cost savings. A single Altra Air Fan (Figure 4 (b)) made by the largest Canadian manufacturer of industrial fans, Envira-North Systems[79], allowed a cost saving of USD 14,708 in energy costs over six months while keeping a 2,500 m2 air-conditioned site comfortably cool[80].

There are many other examples of bio-inspired products or processes showing an increased awareness about bio-mimicry and the potential it offers to align economic interests with environmental ones and present successful and sustainable business models. This is confirmed by the development in the year 2000 of an index, the Da Vinci Index[81], that measures the activities in the bio-mimicry filed in the US based on a number of factors, including the number of patents linked to bio-inspiration, scholarly articles published and the amounts of grants issued in this field (see figure 5).

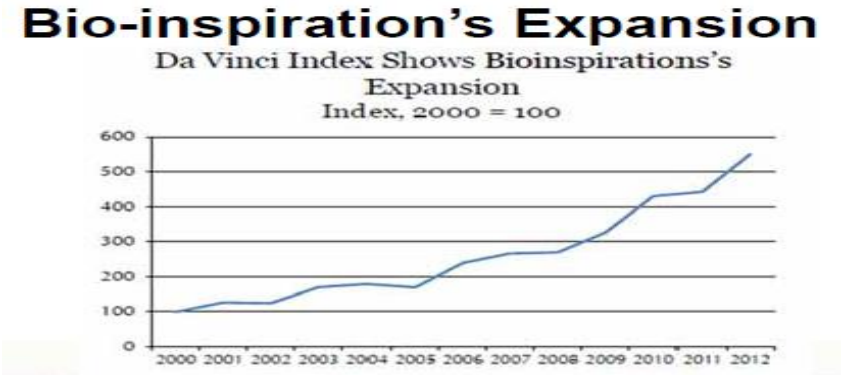

Figure 5: Da Vinci Index evolution between 2010 and 2012[82].

[78] Idem

[79] The original owner of the design is a corporation called WhalePower. Envira-North System bought a license.

[80] K.Z. Ivanić al. Biomimicry – An Overview, The Holistic Approach to Environment 5(2015)1, 19-36, available at: https://hrcak.srce.hr/136003

[81] Bioinspiration: An Economic Progress Report, November 2013, Point Loma, Nazarene University, available at: http://www.magnefico.com/fileadmin/user_upload/Dokumente/PLNU_Bioinspiration_Da_Vinci_Index_A_Progress_Report_November_2013_Final.pdf

[82] Source: International Forum of Bio-mimicry, 2014, accessible at: http://www.biotaiwan.org.tw/download/core3/3-

The index continued its increase until it reached a peak of 12000 points in 2014 and, then, started to slightly decline to flatten out around 10800 in the second half of 2016[83].

5. Knowledge and Sustainability: A Sharia Perspective

5.1 Knowledge

While acquiring basic religious knowledge that is needed to perform a worshiping act or a specific transaction is an obligation on every Muslim (*Fard Ain)*, seeking knowledge in every area of benefit for the *Umma* is an obligation on the community (*Fard Kifaya)*[84] i.e. it is sufficient that it is fulfilled by only a group of Muslims, but if none does it, the whole community is sinful.

Furthermore, seeking knowledge beyond of what is F*ard* is *Sunna*[85], and is highly encouraged. This is consistently shown through the holy Quran and the Sunna of the Prophet Peace Be Upon Him (PBUH).

Allah SWT says in Surat Taha (20) Verse 114:

فَتَعَالَى اللَّهُ الْمَلِكُ الْحَقُّ ۗ وَلَا تَعْجَلْ بِالْقُرْآنِ مِن قَبْلِ أَن يُقْضَىٰ إِلَيْكَ وَحْيُهُ ۖ وَقُل رَّبِّ زِدْنِي عِلْمًا(114)

"*Then exalted be Allah, the True Sovereign! And hasten not (O Muhammad) with the Qur'an ere its revelation hath been perfected unto thee, and say:* ***My Lord! Increase me in knowledge***."

Allah SWT also said in Surat Al Nahl (16) verse 43:

وَمَا أَرْسَلْنَا مِن قَبْلِكَ إِلَّا رِجَالًا نُّوحِي إِلَيْهِمْ ۚ فَاسْأَلُوا أَهْلَ الذِّكْرِ إِن كُنتُمْ لَا تَعْلَمُونَ (43)

"*43. We did not send before you except men whom We inspired. So* ***ask the people of knowledge, if you do not know***."

6%E5%9C%8B%E9%9A%9B%E5%90%88%E4%BD%9C/104/International%20Forum%20of%20Biomimicry%202014%20in%20Taiwan%20(201406).pdf

83 Point Loma Nazerine University, Fermanian Business and Economic Institute, The Da Vinci Index and Biomimicry, accessible at? https://www.pointloma.edu/centers-institutes/fermanian-business-economic-institute/da-vinci-index-biomimicry

84 Fataawa Al-Shaykh Muhammad Ibn Saalih Al-'Uthaymeen, Kitaab Al-'Ilm, P. 23, available at: https://islamqa.info/en/answers/20092/what-is-the-ruling-on-seeking-islamic-knowledge

85 Idem

In addition, the Messenger of Allah PBUH said: "Ask Allah for **beneficial knowledge** and seek refuge with Allah from knowledge that is of no benefit"[86].

He also said PBUH: "Whoever takes a path upon which to obtain knowledge, Allah makes the path to Paradise easy for him"[87].

He further said: "The superiority of the scholar over the worshiper is like my superiority over the least of you…".[88]

Accumulation of knowledge is not a purpose in itself in Islam, Muslims are required to reflect on this knowledge and use their mind to make it useful (make it a beneficial knowledge).

There are many verses that commends Muslims to reflect and use their minds, the most prominent ones are verses 190 to 194 of Surat *Aal Imrane*:

إِنَّ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ وَاخْتِلَافِ اللَّيْلِ وَالنَّهَارِ لَآيَاتٍ لِّأُولِي الْأَلْبَابِ (190) الَّذِينَ يَذْكُرُونَ اللَّهَ قِيَامًا وَقُعُودًا وَعَلَىٰ جُنُوبِهِمْ وَيَتَفَكَّرُونَ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ رَبَّنَا مَا خَلَقْتَ هَٰذَا بَاطِلًا سُبْحَانَكَ فَقِنَا عَذَابَ النَّارِ (191) رَبَّنَا إِنَّكَ مَن تُدْخِلِ النَّارَ فَقَدْ أَخْزَيْتَهُ ۖ وَمَا لِلظَّالِمِينَ مِنْ أَنصَارٍ (192) رَّبَّنَا إِنَّنَا سَمِعْنَا مُنَادِيًا يُنَادِي لِلْإِيمَانِ أَنْ آمِنُوا بِرَبِّكُمْ فَآمَنَّا ۚ رَبَّنَا فَاغْفِرْ لَنَا ذُنُوبَنَا وَكَفِّرْ عَنَّا سَيِّئَاتِنَا وَتَوَفَّنَا مَعَ الْأَبْرَارِ (193) رَبَّنَا وَآتِنَا مَا وَعَدتَّنَا عَلَىٰ رُسُلِكَ وَلَا تُخْزِنَا يَوْمَ الْقِيَامَةِ ۗ إِنَّكَ لَا تُخْلِفُ الْمِيعَادَ (194)

190. In the creation of the heavens and the earth, and in the alternation of night and day, **are signs for people of understanding.** 191. Those who remember Allah while standing, and sitting, and on their sides; **and they reflect upon the creation of the heavens and the earth**: "Our Lord, You did not create this in vain, glory to You, so protect us from the punishment of the Fire." 192. "Our Lord, whomever You commit to the Fire, You have disgraced. The wrongdoers will have no helpers." 193. "Our Lord, we have heard a caller calling to the faith: `Believe in your Lord,' and we have believed. Our Lord! Forgive us our sins, and remit our misdeeds, and make us die in the company of the virtuous." 194. "Our Lord, and give us what You have promised us through Your messengers, and do not disgrace us on the Day of Resurrection. Surely You never break a promise."

5.2 Sustainability

The first question that needs to be addressed here is whether or not earth has been made with enough resources to sustain life for all beings. In other words, are the current challenges that humanity faces as to the continuity of life on earth due to happen anyway because of the lack

[86] Sunan Ibn Majah, Vol 5, Book 34, Hadith 3843, Hasan

[87] Jami' at-Tirmidhi 2646, Vol 5, Book 39, Hadith 2646, Sahih

[88] Jami' at-Tirmidhi, Vol 5,Book 39, Hadith 2685

of resources? or are they completely attributable to humanity's mismanagement of these resources and, thus, they could have been avoided?

Allah SWT says in Surat Al Baqara (2) verse (36):

فَأَزَلَّهُمَا الشَّيْطَانُ عَنْهَا فَأَخْرَجَهُمَا مِمَّا كَانَا فِيهِ ۖ وَقُلْنَا اهْبِطُوا بَعْضُكُمْ لِبَعْضٍ عَدُوٌّ ۖ وَلَكُمْ فِي الْأَرْضِ مُسْتَقَرٌّ وَمَتَاعٌ إِلَىٰ حِينٍ (36)

36. "But Satan caused them to slip from it, and caused them to depart the state they were in. We said, "Go down, some of you enemies of one another. ***And you will have residence on earth, and provision for a while.****""*

The Arabic word for provision in the verse is (*Mataa'),* which is broader than provision, as it refers to anything that can be enjoyed in life such as material commodities, pleasures, etc.[89] Allah SWT made these available on earth for a while, that is until the day of resurrection[90].

Allah SWT also said in Surat Fussilat (41) Verses 9 and 10:

قُلْ أَئِنَّكُمْ لَتَكْفُرُونَ بِالَّذِي خَلَقَ الْأَرْضَ فِي يَوْمَيْنِ وَتَجْعَلُونَ لَهُ أَندَادًا ۚ ذَٰلِكَ رَبُّ الْعَالَمِينَ (9) وَجَعَلَ فِيهَا رَوَاسِيَ مِن فَوْقِهَا وَبَارَكَ فِيهَا وَقَدَّرَ فِيهَا أَقْوَاتَهَا فِي أَرْبَعَةِ أَيَّامٍ سَوَاءً لِّلسَّائِلِينَ(10)

9. Say, "Do you reject the One who created the earth in two days? And you attribute equals to Him? That is the Lord of the Universe." 10. He placed stabilizers over it; and blessed it; ***and planned its provisions*** *in four days, equally to the seekers".*

Allah SWT further said in Surat Al Rahman (55) Verses 10-13:

وَالْأَرْضَ وَضَعَهَا لِلْأَنَامِ (10) فِيهَا فَاكِهَةٌ وَالنَّخْلُ ذَاتُ الْأَكْمَامِ (11) وَالْحَبُّ ذُو الْعَصْفِ وَالرَّيْحَانُ (12) فَبِأَيِّ آلَاءِ رَبِّكُمَا تُكَذِّبَانِ(13)

"10. And the earth; ***He set up for the creatures****. 11.* ***In it are fruits, and palms in clusters.*** ***12. And grains in the blades, and fragrant plants****. 13. So which of your Lord's marvels will you deny?"*

All these verses show that Allah SWT created earth and put in it, in a planned manner, all resources and conditions needed to sustain life until the day of resurrection. If life sustainability is threatened, this can be only due to the way these resources are managed.

The second question that needs now to be addressed is how Allah SWT wanted us to use and manage these resources? To answer this questions, two cases need to be addressed:

5.3 Muslims, as consumers

89 Tafseer Al Tabary, available at: http://quran.ksu.edu.sa/tafseer/tabary/sura2-aya36.html

90 Idem

The key word here is '*balance'*. Muslims, as consumers, are commended to behave in a balanced way; they can still strive to satisfy their needs and desires (i.e. maximize their utility) but they must not commit "*Israf" or "tabzir".*

Allah SWT said in Surat Al Furqan (25) Verse 67 in the description of true believers (*Servant of Al Rahamn*):

وَالَّذِينَ إِذَا أَنفَقُوا لَمْ يُسْرِفُوا وَلَمْ يَقْتُرُوا وَكَانَ بَيْنَ ذَٰلِكَ قَوَامًا(67)

"(67) And [they are] those who, when they spend, do so not excessively or sparingly but ***are ever, between that, [justly] moderate***".

Allah also said in Surat Al Rahman (55) Verses 7 and 8:

وَالسَّمَاءَ رَفَعَهَا وَوَضَعَ الْمِيزَانَ (7) أَلَّا تَطْغَوْا فِي الْمِيزَانِ (8)

"(7) And the heaven He raised ***and imposed the balance (8) That you not transgress within the balance.****"*

Conversely, Allah SWT does not like those who are wasteful and extravagant in their behavior.

Allah SWT said in Surat Al Aaraf (7) Verse (31):

يَا بَنِي آدَمَ خُذُوا زِينَتَكُمْ عِندَ كُلِّ مَسْجِدٍ وَكُلُوا وَاشْرَبُوا وَلَا تُسْرِفُوا ۚ إِنَّهُ لَا يُحِبُّ الْمُسْرِفِينَ (31)

"(31) O children of Adam, take your adornment at every masjid, ***and eat and drink, but be not excessive. Indeed, He likes not those who commit excess****."*

Allah SWT also describes the wasteful as brothers of devil. He said in Surat Israa (17) Verse 27:

إِنَّ الْمُبَذِّرِينَ كَانُوا إِخْوَانَ الشَّيَاطِينِ ۖ وَكَانَ الشَّيْطَانُ لِرَبِّهِ كَفُورًا(27)

"(27) Indeed, ***the wasteful are brothers of the devils****, and ever has Satan been to his Lord ungrateful."*

Finally, the Prophet PBUH disapproved waste of water even in performing ablution, which is an act on worshiping, as demonstrated in the following Hadith:

عَنْ عَبْدِ اللَّهِ بْنِ عَمْرِو بْنِ الْعَاصِ رضي الله عنهما (أَنَّ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ مَرَّ بِسَعْدٍ وَهُوَ يَتَوَضَّأُ فَقَالَ: مَا هَذَا السَّرَفُ يَا سَعْدُ؟ قَالَ : أَفِي الْوُضُوءِ سَرَفٌ ؟ قَالَ : نَعَمْ ، وَإِنْ كُنْتَ عَلَى نَهْرٍ جَارٍ).

Abdullah Ibn Amr ibn Al Aas, may Allah be pleased with both of them, said: "The Prophet PBUH passed by Saad (Ibn Abi Wakkas) while he's making ablution and said: "O Saad, what

is this wastefulness? Saad said: Is there wastefulness in ablution? The Prophet said: Yes, even if you were on a running river."[91]

5.3 Muslims, as producers

The concept of balance referred to above applies to producers in the same way as it applied to consumers. Hence, producers are not prohibited from seeking profits, which is their main motivation for carrying on their activity. They should do so while taking into consideration the interests of others i.e. they cannot cause harm to others.

If their activities result in a harm to the environment or the community, then these activities become haram. This is the essence of the Sharia Maxim (which is also a hadith[92]): **"لا ضرر ولا ضرار"**, which can be translated to: "Do not harm yourself and do not cause harm to others".

Moreover, they will need to remove the harm they caused, as per another Sharia Maxim: " **الضرر يزال**", which means: "*Harm shall be removed".*

In addition, when consumers behave rationally and do not commit wastefulness and extravagance, producers' incentive to produce more or to produce unnecessary commodities will be limited and, hence, pressure on available resources will be reduced.

Therefore, the holy Quran and the noble Sunnah clearly assert that resources on earth are sufficient to sustain life for all beings until the day of judgement and that human beings are required to use these resources rationally i.e. without extravagance or wastefulness and without causing harm to others.

This is further confirmed by the five Maqasid of Sharia viz. preservation of: (i) faith, (ii) self, (iii) intellect, (iv) posterity and (v) wealth.

Preserving posterity is of particular relevance here, as it ensures that the interests of next generations and their rights into sufficient resources and proper environmental conditions (clean air and water, etc.) are preserved. This is the essence of sustainability.

[91] Sunan Ahmad (Hadith No. 6768) and Ibn Majah (Hadith 419), available at: https://islamqa.info/ar/answers/171285/%D9%87%D9%84-%D9%88%D8%B1%D8%AF-%D8%AD%D8%AF%D9%8A%D8%AB-%D8%A8%D8%AE%D8%B5%D9%88%D8%B5-%D8%A7%D9%84%D8%A7%D8%B3%D8%B1%D8%A7%D9%81-%D9%81%D9%8A-%D8%A7%D9%84%D9%85%D8%A7%D8%A1

[92] Hadith narrated by Abu Said Al Khudhari May Allah be Pleased with Him, Sunan Ibn Majah, available at: http://articles.islamweb.net/media/index.php?page=article&lang=A&id=77768

6. Conclusion

Transition to CE is a difficult and lengthy process. It requires a fundamental change in the behaviors of all relevant stakeholders, particularly consumers and producers.

To make the task easier, efforts should focus on making the transition interesting from an economic point of view. The argument should go beyond highlighting the dangers of linear economy on the environment to cover the economic benefits that CE can bring. The development of blue economy can be seen as an illustration of these efforts.

Knowledge is key in addressing the challenge of making transition to CE profitable or at least economically viable. Knowledge has to be seen as an economic resource or a factor of production with very particular characteristics compared to material resources. It can be seen as factor of production the price of which is *A*t* (attention multiplied by time).

Knowledge, when focused on learning from nature (biomimicry), can offer seriously viable options for transition to CE. That is why the key recommendation for policy makers should be more focus on knowledge. Education systems have to be reformed in a way that decouples gaining knowledge from suffering or pain. It is only when we love what we learn that the attention is at its peak for a longer period and the time spent working is not a suffering but rather a reward.

From Sharia perspective, both gaining (beneficial) knowledge and achieving sustainability are highly encouraged. In many instances, they are seen as *fard* i.e. religious requirements, failure of doing which is a punishable sin. Furthermore, taking inspiration from nature is an implementation of a religious requirement, that is to reflect on the creation of Allah SWT.

Therefore, achieving sustainability using knowledge is perfectly in line with Sharia principles and Maqasid.

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SESSION VI:

CIRCULAR ECONOMY: CONCEPTS, MODELS - CHALLENGES & OPPORTUNITIES

The Concepts, Challenges and Opportunities of Circular Economy

Salwa Hamed Al Mulla

The world is exposed to many pressures and crises at different levels, including the political and the economic levels which are associated with the welfare of the human being, social stability and environmental conservation. The economic factor is the primary basis for the stability of countries and development of their societies. Oil prices for instance and other highly volatile and depletable natural commodities which are the cornerstone of production and development and the main source of state's expenditure. Not to mention its association to major industrial use nationally and internationally. Due to the aforementioned factors, it is imperative for the economic policies that are reinforced by national visions of countries targeting sustainable development to find environmentally friendly alternatives. our planet is exposed to pollution, climatic crises and other defects of major industries carried out by industrialized countries that led to pollution and the destruction of nature. For this reason, leaders at the global level are seeking to convene a climate conference to discuss and find alternatives to save the planet from pollution and destruction. In addition, the culture of consumption, which is one of the main principles that needs to be changed, starting with families, schools and education at different levels. The culture of waste disposal is important to pay attention to and commit through shifting towards a circular economy and a recycling trend. As well as developing new healthier production approaches which will enhance the shift towards circular economy.

The concept of the circular economy is in line with the mandate of international organizations and private associations concerned with the environment and its components. The concept of circular economy is beginning to emerge, which indicates achieving growth and sustainable development without disrupting the ecosystem. Taking into account the Maqasid of Sharia which calls for the preservation of religion, soul, intellect, lineage and wealth, which are considered to be comprehensive principles of sustainable development, the shift towards a circular economy has become a priority for countries and drawing national strategies and visions for the coming years is vital to the contribution of achieving sustainable development.

A Consumer Perspective of The Circular Economy: An Empirical Investigation Through Structural Equation Modelling

Muhammad Tahir Jan

Abstract

The growing concerns about environmental decimation have given rise to a new approach called "The Circular Economy", with the focus on introducing innovative and new methods of responsible production, consumption, and disposal. This is also aligned with the United Nations Sustainable Development Goals (UN SDG), particularly goal number twelfth where the focus is on responsible production and consumption. In marketing, there is only a limited number of studies conducted to explore and investigate the circular economy from a marketing perceptive. The present study, therefore, attempts to investigate some inevitable factors with their impact on consumer purchase intention. For this purpose, the theory of planned behaviour is adapted with the addition of two more factors related to the circular economy, which are convenience/ availability, and environmental impact, as extracted from the literature to examine their effect on consumer purchase intention. Data were collected from 377 consumers of the circular products. Complex statistical techniques like exploratory factor analysis and structural equation modelling with confirmatory factor analysis and hypotheses testing were used to analyse the data. The findings revealed that subjective norm, attitude, and environmental impact are the most influential factors toward consumer purchase intention of circular products. These findings will help policy-makers devise strategies that are not only sustainable and aligned with the philosophy of the circular economy but will also ensure positive consumer behaviour.

Keywords: Circular economy, consumer purchase intention, sustainability, structural equation modelling, TPB, Malaysia

INTRODUCTION

Today the world is faced by numerous challenges, especially due to the increased consumption with almost no solid method of recycling the waste produced by the products. The philosophy where the focus of the businesses around the globe was to produce an unlimited quantity of products and influence people to buy and use those products without the conscious and clear understanding of its implications is called "the linear economic system" or simply "the linear economy". Where producers and businesses are mainly concerned to produce and sell their

products. As much as, this philosophy sounds good, at least from a financial perspective, it has done enormous damage to the environment and the generation to come. To mitigate the impact of the linear economy, a new approach was introduced called “the circular economy”. The focus of this new system is on re-use, repair, refurbishment, and recycling (EMF 2013). The circular economy also emphasises on producing those products that are durable. Interestingly, the United Nations Sustainable Development Goals (commonly called, SDGs) have many goals related to the concept of the circular economy. The one which is very relevant to the present research is the twelfth SDG, where the focal point is responsible production and consumption. For the scope of this research, responsible consumption would be considered as the key motivation.

There is a lack of consensus when it comes to the definition of the circular economy, however, it is generally agreed that the existing business models should be redesigned from linear (which results in waste) to circular (which reduces/ reuses waste) (Chamberlin and Boks 2018). Further, the existing models are mostly from the perspective of the organisations or businesses, completely neglecting the consumer perspective. This paper, therefore, attempts to bring-in the consumer perspective by empirically investigating factors related to the purchase of circular products and examine their influence on consumer purchase intention.

In the following section, a review of literature is undertaken along with the presentation of the proposed model which is inspired by an underlying theory of planned behaviour. Further, the methodology adopted in the present research is explicated followed by data analysis and results, and then conclusion and suggestions for future research.

LITERATURE REVIEW

The circular economy

The exponential growth in the industrial economy and globalisation have criticised, if not obsoleted, the traditional models of production and consumption. These models are usually referred to as “linear models”, where the focus is on take, make, and dispose of. The reason behind this stiff criticism on the linear models is mainly because of the inevitable impact it has on everything, negatively. Bocken et al. (2016) are of the view that products produced in the linear system lose its value, especially at the end of its life, making it compulsory to dispose it off and eventually harm the environment. This is the main reason these traditional models require continuous unlimited resource inputs to meet the demand, thus impacting the environment adversely by the emission and generation of waste (EMF 2014). It is, therefore,

clear that the linear models are no more compatible with the philosophies of sustainable social, economic, and environmental growth, as desired by the people. Even though there are economic benefits and labour market advantages of the linear system, it also leads to the increase in production and consumption, which consequently degrade the environment (Ekins et al. 2016). This calls for a system where the production and consumption do not put pressure on the environment at large. In this pursuit, a framework is put forward by researchers and experts where the focus is on each stage of production and consumption life cycle. A philosophy where the outputs become the inputs of another process, eliminating the need for new material, thus reducing waste.

Over a period of few years, the concept of circular economy has evolved but there is an agreement concerning the main theme behind it, and that is closing of material and energy flow loops. Across various fields, different names and terms are used to represent the same concept of the circular economy. For example, Stahel (2010) called it the performance economy, Graedel and Allenby (1995) mentioned it using the terms "industrial ecology, and Commoner (2014) named it the laws of ecology. Further, the most interesting and relevant to the present study is the design and business model strategies proposed by Bocken et al. (2016). They provided a model for circular product design where the emphasis is on slowing or closing the flow loops through extended product life cycles, designs for dis-assembly, and encouraging sufficiency (Chamberlin and Boks 2018) by educating the consumers. Relevant to the scope of the present study, the circular economy can be defined in the words of Geissdoerfer et al. (2017, 579) as, "a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling."

Marketing and the circular economy

There are many philosophies of marketing, from production orientation to societal marketing (Armstrong et al. 2018), and quality-of-life marketing (Jan and Zain 2011; Lee and Sirgy 2004; Sirgy 2001). Companies use the traditional marketing mix (4 Ps; Product, Price, Promotion, Place) to create markets (Armstrong et al. 2018; Kotler et al. 2015), and use persuasive techniques to influence people's intention in a manner that needs for unfamiliar products are created (Fletcher 2010). However, these traditional concepts of marketing are significantly replaced by more sustainable concepts like green marketing, where the emphasis is on producing products with lower impacts on the environment and higher credentials of sustainability (Groening et al. 2018; Dangelico and Vocalelli 2017). This perspective of

marketing with the integration of sustainability in the business models and a focus on environmental impacts is seen as facilitating the circular economy (Tukker 2015). Another interesting concept of marketing aligned with the philosophy of circular economy is societal marketing where the focus is on bigger social welfare and positive behavioural change for the benefit of the society (Peattie and Peattie 2009; Kotler and Zaltman 1971). Peattie and Peattie (2009) argue that societal marketing is more customer-oriented compared to green marketing (which ignores non-purchase elements of consumption like use and disposal) because it focuses mainly on changing and maintain consumer behaviours (which involves non-purchase elements of consumption like recycling and relationship building), making is very closely aligned with circular economy.

Even though the literature on the circular economy has grown over a period of time, there is a dearth of research on the circular economy from a consumer perspective (Chamerlin and Boks 2018), especially when it comes to the involvement of consumers in the equation of circular economy. For instance, consumers' performance of activities that encourage circular economy's concept, like the purchase of used products, re-usable products, re-cycleable products, green products, resisting obsolescence, or rental instead of buying, etc. and what influence them to purchase circular products? To answer this question, the present research attempts to use the theory of planned behaviour (hereafter, TPB) in order to find out those significant factors that have an influence on consumer purchase intention of the circular products. TPB was originally introduced by Ajzen (1991) and is considered one of the most widely and frequently used theories for the prediction of human social behaviour (Ajzen 2011). There are three antecedents of intention in TPB, which are attitude, subjective norm, and perceived behavioural control. Altogether the three independent variables (attitude, subjective norm, perceived behavioural control) influence intention, and intention subsequently impacts behaviour (Ajzen, 1991). In the TPB, both perceive behavioural control and intention effect behaviour. However, it is important to note that the present research did not consider "behaviour" in the model, as it is a post-purchase phenomenon, rather "intention" is used as an ultimate dependent variable. Further, in the current research, the original three factors are included to examine their influence on consumers' purchase intention of the circular products along with the extension of TPB. TPB has been extending from time to time with the addition of more contextual variables (Conner and Armitage 1998). In the present study, two more antecedents of intention related to circular economy and marketing are added in the existing TPB model. These two variables, extract from the extant literature, are convenience/availability and environmental impact (Chamerlin and Boks 2018; Yadav and Pathak 2016). In the

following sections, all these variables are explained in light of the literature, which eventually led to the hypotheses of the current research.

Purchase intention

Purchase intention has always been a topic of interest for marketing researchers because of its inevitable pre-purchase importance. According to Ajzen (1980), intention is a person's perception of his/her conscious plan or decision in performing a certain behaviour or action. TPB posed that intention is the direct antecedent of a behaviour, which itself is determined by three main considerations, namely, attitude, subjective norm, and perceived behavioural control (Ajzen 2015). Purchase intention plays a vital role in understanding a consumer's perspective, which in the case of this study is circular products or products produced using circular economy's concept. There are numerous studies conducted that indicate the positive influence of attitude, subjective norm, and perceived behavioural control on purchase intention (see e.g., Afendi et al. 2014; Khalek and Ismail 2015). As mentioned earlier, many scholars (see e.g., Aziz and Wahad 2013; Haro 2016) investigated other determining factors along with the original factors of TPB and their results indicated positive relationships among the variables. Some added knowledge and safety in the TPB model (Aziz and Wahab 2013), whereas, some included information and availability (Haro 2016), and religious values with its impact on the purchase of green products (Hassan 2014). The present research, therefore, added convenience and environmental impact (Chamerlin and Boks 2018) and hypothesise that these will have a positive impact on consumer purchase intention of circular products.

Attitude

Attitude refers to the degree of positive or negative feelings an individual has towards the behaviour of interest (Ajzen 1991). There is a positive relationship between an individual's attitude toward certain behaviour and the degree of the strength of his/her intention to perform that behaviour (Ajzen 1991). Attitude is considered as one of the most significant factors that influence consumer's intention to purchase products (Rahman et al. 2015). As an integral part of TPB, the attitude has been known to have a positive influence on purchase intention. For example, Tarkiainen and Sundqvist (2005) found a significant positive impact of attitude on purchase intention in organic and green products. Similarly, other studies (Yazdanpanah and Forouzani 2015; Huong 2012) resulted in positive outcomes in the relationship between attitude and purchase intention. It is, therefore, hypothesised that:

H1: Attitude will have a positive impact on purchase intention

Subjective norm

According to Ajzen (1991), subjective norm is a person's belief about what others will think of him/her in the event of performing a task or behaving in a certain manner. It is the perception of an individual of the social environment surrounding a behaviour. In the case of TPB, the subjective norm is strongly linked with a person's intention and is considered the pressure of social normative presence. People intention to act in a certain manner is influenced by family and friends, and society around him/her. This disposition to perform or not to perform a certain behaviour is dependent on the approval from the social circle of the person (Ajzen 1991). Vallerand et al. (1992) found a positive relationship between subjective norm and intention. Many scholars (see e.g., Govind and Pathak 2016; Othman and Rahman 2014) argue that in the TPB, subjective norm is the strongest predictor of intention to purchase a product. Further, Dean et al. (2008) conducted a research on organic and environmentally friendly products and found that subjective norm plays a vital role in influencing consumer's intention to purchase these products. Moreover, subjective norm is found not only to positive and significantly influence purchase intention but also other variables, like confidence (Omar et al. 2012). Lastly, Haro (2016) found a strong influence of subjective norms in buying products produced in an ethical manner. Based on the above literature, it is hypothesised that:

H2: Subjective norm will have positive impact on purchase intention

Perceived behavioural control

Perceived behavioural control refers to a person's perception about the ease or difficulty of performing a task. It is an individual's perception of the inhibited obstacles in the performance of a certain behaviour (Ajzen 1991). Perceived behavioural control, as an important variable of TPB, is also known to have a positive impact not only on intention but also behaviour (as presented in the original TPB model) (Ajzen 1991). There are two important aspects to keep in mind, especially with regard to this particular variable of TPB. First, the control a person has on performing a task/behaviour, and second, the confidence of a person in doing or not doing a task/behaviour. Vermeir and Verbeke (2006, 2008) found a positive influence of perceived behavioural control on purchase intention of sustainable product by highlighting that low perceived availability results in lower purchase intention. Further, in an interesting attempt Shin and Hancer (2016) found not only a direct affect of perceived behavioural control on purchase intention, but also an indirect affect. Lastly, a study by Rezai et al (2012) related to green and environmentally friendly products found that perceived behavioural control positive influence consumers' purchase intention. It is, therefore, hypothesised that:

H3: Perceived behavioural control will have a positive impact on purchase intention.

Convenience

Convenience refers to the ease of getting access to a product (Chamerlin and Boks 2018). It simply means that how much efforts are put by the consumers before gaining initial access to the product. Originally, the concept of convenience emerged in marketing literature with regard to the classification of products. Consumer products are divided into three (3) main classes: convenience, shopping, and specialty. Convenience products are those products which are purchased with the minimum efforts and time spent by the consumers (Yale and Venkatesh 1986). In the context of the present study, convenience is included in the TPB because of its strong influence on customer purchase intention and choice (Gunawan et al. 2018; Pham et al. 2018). Studies (see e.g., Farquhar and Rowley 2009; Weelden et al. 2016) show that convenience is more of a consumer related variable rather than a product/service related, and is considered an imperative construct in marketing. For companies to attract customers to buy their products and add value to customers, convenience should be added as a crucial factor in their overall marketing strategies (Kim et al. 2014). Further, when a customer intent to purchase a product, both monetary and non-monetary costs are considered. Convenience is considered a non-monetary cost that includes time and effort (Berry et al. 2002) and is undeniable because of its influence on purchase intention. This is evident from the past studies (Jiang and Jun 2012; Mpinganjira 2015, Pham et al. 2018) that shows a direct positive effect of convenience on purchasing trends. Jiang et al. (2012) proposed convenience to have multiple dimensions and includes; access, search, evaluation, transaction, and possession. The access dimension is related to the consumer's perceived time and effort spent on accessing the product. The search dimension states the time and efforts consumers devote to searching for the desired product. The evaluation dimension is about consumer's evaluation of the product compared to the competing offers. The transaction dimension is related to the consumer's perceived time and effort used in finally purchasing the product. The last dimension, which is possession is about consumer's perceived time and effort to own a product (Jiang et al. 2012). In the present study, convenience is taken as a first-order construct following the recommendations of Pham et al. (2018) and is expected to influence consumer's purchase intention of circular products, as agreed by Jiang et al. (2012) and Pham et al. (2018). It is, therefore, hypothesised that:

H4: Convenience will have a positive impact on purchase intention.

Environmental impact

Environmental impact refers to the production and consumption of those products with a lower to no impacts on the environment at large (Groening et al. 2018; Dangelico and Vocalelli 2017). It has two perspectives, a consumer's perspective, and a producer's perspective. In the

consumer's perspective, environmental impact means the understanding of consumers toward purchasing and consuming products with no adverse effect on the environment. It further means that before the consumer intends to buy a product, he/she is aware of the harm it may do to the environment. Similarly, from the perspective of the company or producer, environmental impact includes adopting green and sustainable ways that emphasise on both tangible and intangible aspects of production (Segev et al. 2015; Grimmer and Woolley 2012). In the present study, however, a consumer's perspective is considered keeping in mind the scope of the research. Even environmental impact of consumers' activities is considered during the use of product stage rather than the purchase stage itself, but the present research considered it as a factor that will positively influence consumer intention to purchase a circular product. The argument put forward in this research is that if consumers are aware of the positive impact of circular products on the environment, they will tend to show positive intentions in buying those products. The literature also supports this argument that environmental concerns positively influence consumer's purchase intention (see e.g., Hedlund 2011). This is also supported by Chamerlin and Boks (2018), who stated that people are generally positive and supportive when it comes to environmental concerns or products with positive/negative impact on the environment. It is, therefore, hypothesised that:

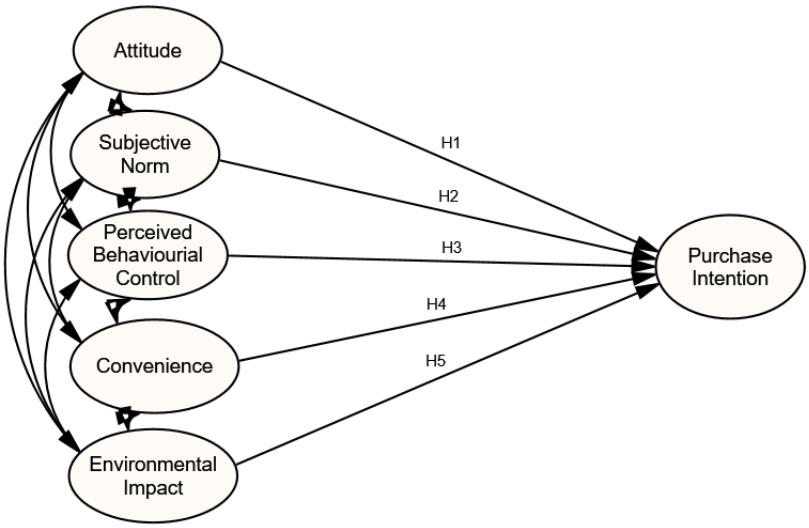
H5: Environmental impact will have a positive effect on purchase intention

FRAMEWORK OF THE STUDY

Based on the above discussion, the model presented in Figure 1 is proposed for empirical investigation. It has four (4) original constructs from TPB, namely, attitude, subjective norm, perceived behavioural control, and intention. Two (2) more variables, namely, convenience and environmental impact, are included after reviewing the literature on the circular economy and marketing. Overall, the model of the current research consists of five (5) exogenous variables and one (1) endogenous variable.

Figure 1

Propose model of the study



METHODOLOGY

Sampling

A convenience sampling technique was used in the present study, where five hundred (500) questionnaires were distributed by the researcher and the appointed assistants. Data were collected from various regions of Klang Valley in Malaysia. Respondents were approached in the shopping malls and universities. The researchers and appointed assistants would first explain the main reason behind the research before letting them fill up the questionnaire. Respondents were guided and briefly educated about the circular economy. They were requested to think of some circular products like re-usable straws, edible straws, reusable water bottles, paper bags, reusable cotton bags, and rechargeable batteries, etc. before answering the questions about their purchase intention. An interesting attempt was made to collect data where the soft copy of the questionnaire was provided to the respondents instead of the hard copy and they were asked to reply to the questionnaire using their smart devices. Out of the total five hundred (500) distributed questionnaires, three hundred and seventy-seven (377) were finally selected for data analyses, yielding a response rate of 75.4%. The main reason behind choosing soft copies for the survey was an attempt to implement the concept of sustainability and circular economy by replacing printed copies of the questionnaire with soft copies, which have little to no effect on the environment. The researcher would like to recommend to the future researcher to adopt this method of collecting data, as the response rate was high and acceptable. The sample consists of 47% female and 63% male.

Research instrument

For the present study, a self-administered structured questionnaire was used. The questionnaire was divided into two main parts. The first part of the questionnaire was designed to acquire information on various demographic variables, whereas, the second part of the questionnaire was designed to collect data on all the dependent and independent variables of the study. In this case, there are five (5) independent variables, namely, attitude, subjective norm, perceived behavioural control, convenience, and environmental impact, and one (1) dependent variable, namely, purchase intention. All the items included in the questionnaire were adapted from previous studies and adjusted slightly to suit the context of the present research. Throughout the instrument, a five-point Likert scale (with "1" strongly agree and "5" strongly disagree) was used to measure the level of agreement with variables. A total of 377 usable responses were gathered in a period of around two (2) months. For data analyses, SPSS and AMOS version 22 were used.

DATA ANALYSES AND RESULTS

Respondents' profile

Data collected on the first section of the questionnaire, which was on various demographic variables, contained questions on gender, age, income level, education, and marital status. Based on the results, the majority of the respondents were males with 63% contribution to this research. The remaining 47% were female respondents. About age, the majority (45.4% or 171) were from the age bracket of thirty (30) years old and above, followed by an age group of 25 to 29 years with a total contribution of 22.5% or 85. Most of the respondents (44.6% or 168) hold a postgraduate degree and were married (66.6% or 251). Lastly, this research was mainly influenced by the respondents with an income level of RM 1000 to RM 4000 (41.6% or 157) followed by RM 1000 and below with a contribution of 23.1% or 87.

Attributes of the questionnaire

An important step in the data analysis to ensure the stability and consistency of the questionnaire is to undertake a reliability test. For this purpose, Cronbach's alpha reliability coefficient and the item-to-total correlation were calculated. Nunnally (1978) recommended a value of 0.70 and above acceptable, indicating a strong research instrument. Cronbach's alpha

of the present questionnaire resulted in a value of 0.959, confirming high consistency and stability of the research instrument (see Table 1).

Table 1

Reliability Statistics of the Questionnaire

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.958	0.959	27

Exploratory factor analysis (EFA)

To find out the factors underlying the data, exploratory factor analysis (hereafter, EFA) with Varimax rotation was performed. Hair et al. (2013) provided valuable suggestions which were kept in mind, for example, any item with a loading of 0.4 and below were deleted, and items with the cross-loading of below 0.35 were also removed. Further, Kaiser-Meyer-Olkin (KMO) was 0.943, indicating the suitability of the present data for factor analysis, and Bartlett's Test of Sphericity was significant at $p < 0.001$, indicating the acceptable correlations between the variables.

Table 2

Exploratory Factor Analysis

Rotated Component Matrix						
Items (Variables)	**Components**					
	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**
	Subjective Norm	**Purchase Intention**	**Perceived Behavioural Control**	**Environmental Impact**	**Attitude**	**Convenience**
SN2	.821					
SN5	.802					
SN4	.787					
SN6	.779					
SN3	.739					
SN1	.722					
PI12		.879				

PI13		.873				
PI14		.868				
PI11		.837				
PI15		.835				
PBC4			.851			
PBC1			.826			
PBC2			.671			
PBC3			.627			
ENV2				.801		
ENV3				.697		
ENV1				.617		
ENV4				.599		
ATT2					.805	
ATT1					.794	
ATT4					.507	
CON3						.806
CON4						.794
CON1						.733
CON2						.710
Initial Eigenvalues	13.599	2.232	1.943	1.469	1.238	1.001
% of Variance	19.645	18.040	11.824	10.100	10.033	9.918
Cumulative %	19.645	37.686	49.510	59.610	69.643	**79.561**

EFA resulted in a clean six-factor structure, as originally envisaged, using the criteria of eigenvalue >1. The total variance of these six extracted factors was 79.56%, and all the items loaded on their respective factor than on any other factor, establishing discriminant validity of the measurement. The result of EFA is presented in Table 2.

The next step followed is confirmatory factor analysis (CFA).

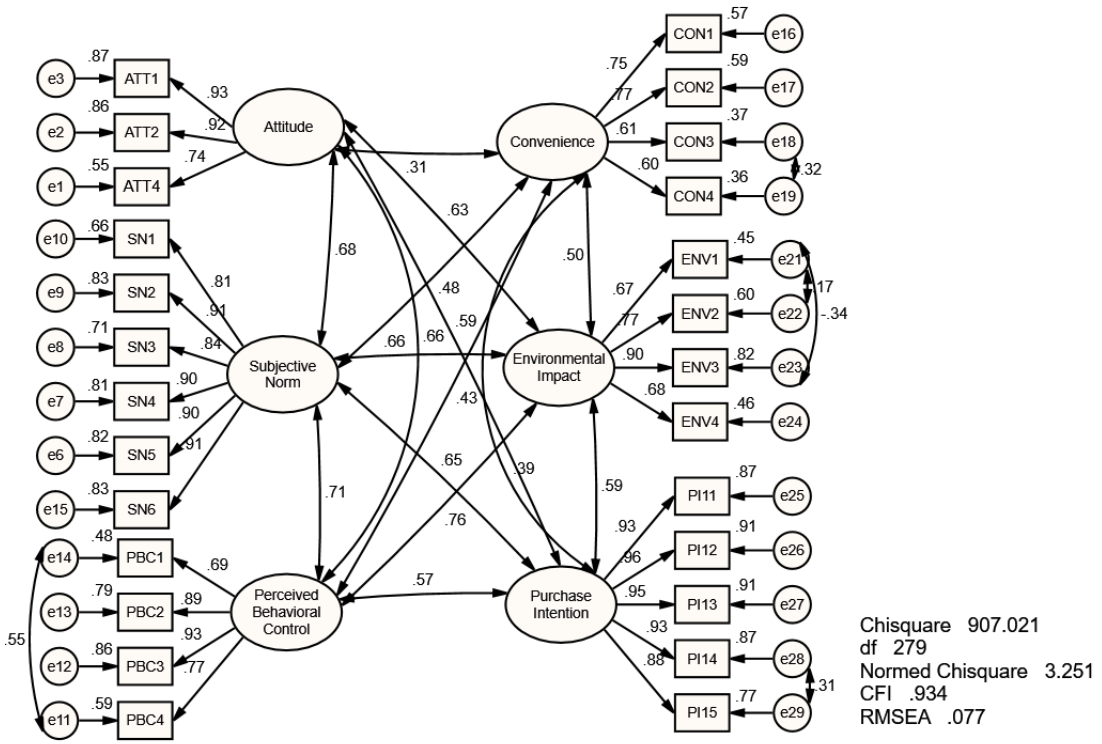
Confirmatory factor analysis (CFA)

Confirmatory factor analysis (hereafter, CFA) is a method in the two-step structural educational modelling (SEM) approach, where extracted factors from EFA are first confirmed

in a measurement model before proceeding with testing the fitness of the full-fledged structural model and testing the hypotheses. In order to do CFA, AMOS software was used with Maximum Likelihood Estimation (MLE) and fitness of the measurement model was evaluated based on the goodness-of-fit indices recommended by various scholars (Byrne, 2010; Hair et al., 2013; Kline, 2011). The fit indices considered to assess the present measurement model were chi-square ($\chi 2$), normed chi-square ($\chi 2$/df), the comparative fit index (CFI), and the room mean square error of approximation (RMSEA). Figure 2 depicts the final measurement model.

Figure 2

Measurement Model



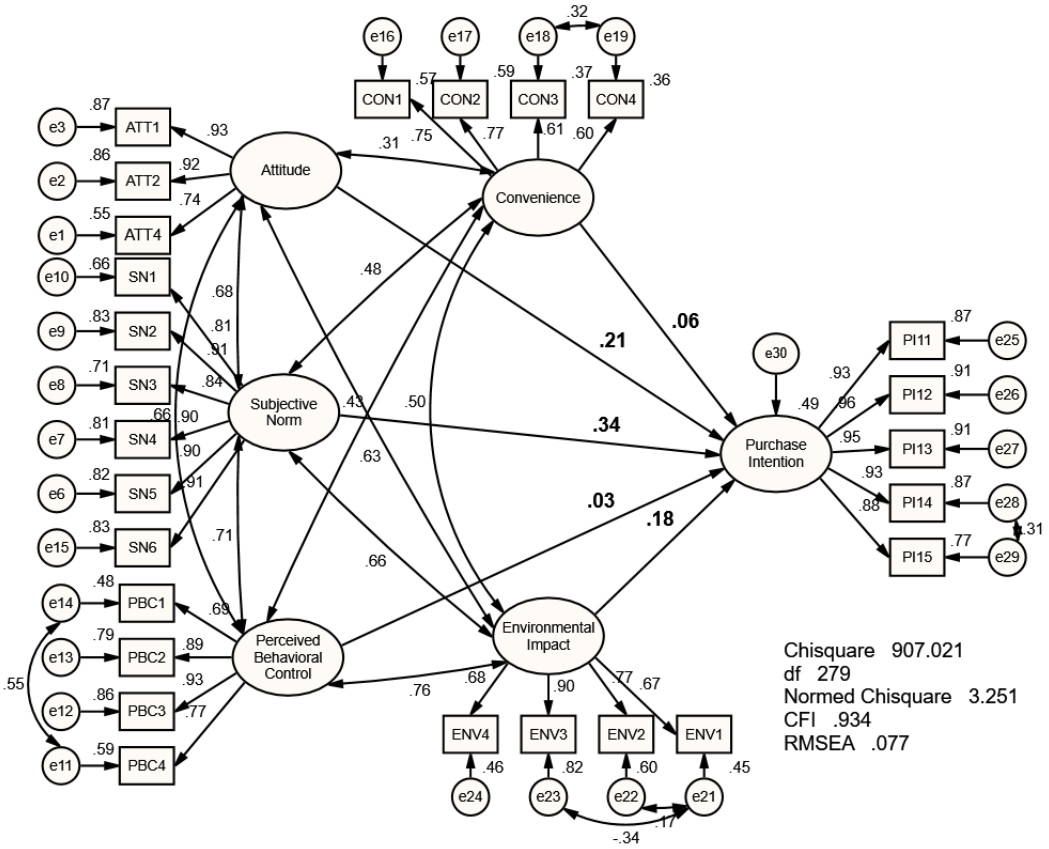
Based on the result of the measurement model of the present research, all the fit indices were above the acceptable threshold. In this case, the normed chi-square ($\chi 2$/df) value is 3.251, which is below 5.0. Similarly, CFI is 0.934, which is above the recommended value of 0.90. Lastly, RMSEA emerged with a value of 0.077, which is also below the acceptable value of < 0.08. These values indicate that the measurement model fits well and is ready to be tested in full-fledged

Hypotheses testing

The next imperative step in SEM, after achieving acceptable results in the measurement model and establishing the reliability and validity, is to test the fitness of the full-fledged model and also to test the hypotheses. Similar to that of CFA, a full structural model is also assessed based on the result of the fit indices. The most common and recommended indices are normed chi-square ($\chi 2$/df), the comparative fit index (CFI), the normed fit index (NFI) and the root mean square error of approximation (RMSEA). The full structural model and hypotheses were also tested using AMOS software. The baseline structural model is presented in figure 3 followed by the result of hypotheses testing, which is presented in Table 3.

Figure 3

Full Structural Model



The result of the hypothesised model revealed that it fits the data very well (see Figure 3). In this case, the goodness-of-fit indices were at the acceptable level with normed chi-square (χ^2/df) = 3.251, the comparative fit index (CFI) = 0.934, the normed fit index (NFI) = 0.907 and the root mean square error of approximation (RMSEA) = 0.077. Further, three (3) out of the total

five (5) structural paths were both statistically and practically significant. The results of hypotheses testing are provided in Table 3.

Table 3

Estimates of the Hypothesised Model

Structural path	Hypothesised Relationship	Std. Reg. Weight	S. E.	C. R.	P
Attitude → Purchase Intention	$H1_s$	0.208	0.088	3.291	0.001
Subjective Norm → Purchase Intention	$H2_s$	0.342	0.073	4.984	***
Perceived Behavioural Control → Purchase Intention	$H3_{ns}$	0.032	0.101	0.412	0.68
Convenience → Purchase Intention	$H4_{ns}$	0.064	0.071	1.157	0.247
Environmental Impact → Purchase Intention	$H5_s$	0.175	0.137	2.245	0.025

Statistic	Suggested	Obtained
Chi-square significance	≥ 0.05	0.000
Normed chi-square (CMIN/*df*)	≤ 5.00	3.251
Comparative fit index (CFI)	≥ 0.90	0.934
Normed fit index (NFI)	≥ 0.90	0.907
Root mean error square of approximation (RMSEA)	≤ 0.08	0.077

s = Supported at $p < 0.05$, ns = Not supported

Based on the results of hypotheses testing presented in Table 3, it is clear that only three (3) out of the total five (5) hypotheses are supported. The supported ones are H1 (attitude has a positive impact on consumer purchase intention), H2 (subjective norm has a positive impact on consumer purchase intention), and H5 (environmental impact has a positive effect on consumer purchase intention). There was not enough evidence to support H3 (perceived behavioural control has a positive impact on consumer purchase intention) and H4 (convenience has a positive impact on consumer purchase intention). It is of high import to note that the causal link between "subjective norm" and "purchase intention" was the strongest with the regression weight of 0.342. It was followed by a structural link between "attitude" and "purchase intention" with the regression weight of 0.208, and "environmental impact" and "purchase intention" with the resulted regression weight of 0.175.

CONCLUSION AND DIRECTION FOR FUTURE RESEARCH

The present research attempted to investigate the consumer perspective of the circular economy by adopting and extending the theory of planned behaviour. This contemporary resonating concept of the circular economy is hardly researched in a marketing setting. The uniqueness of the current research lies not only in choosing the interesting concept of the circular economy but also testing it empirically using complex statistical techniques and revisiting and adding more variables to the theory of planned behaviour. It makes this research strong, contemporary, and extremely important with academic, as well as, practical implications.

The findings of this research attest the importance of subjective norm when it comes to consumers' intention in purchasing circular products or products produced with the philosophy of the circular economy. Further, the present study also established the importance of the attitude of consumers towards their intention to buy circular products. Furthermore, a positive influence of environmental impact on the purchase intention of consumers is also something undeniable. The aforementioned findings are invaluable for policy-makers, practitioners, and global organisations who wish to attract today's environmentally conscious consumers and transform the linear economy to a circular economy.

Perhaps, future researchers may attempt to test the model proposed and tested in this study in other countries and settings. A promising attempt would be to add more constructs to the current model, like cost or financial impact, brand image, design, and customer services or supportive relationship, to name a few, and then test their fitness in a comprehensive model. Lastly, future researchers may test the independent variables of the present study and see their impact on consumer behaviour.

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Financial Development and Ecological Footprint in OIC Countries Islamic Perspectives and Empirical Evidence

Muhammad Tariq Majeed

Abstract

The rising importance of financial development in affecting environmental quality has attained the attention of various researchers in the recent decades. In particular, financial sector can play an important role in contributing to dominant 'linear economy paradigm' at the cost of quality of environment. In contrast, financial sector can also contribute to circular/ecological economy, thereby preserving the environment for future generations. This study analyzes the relationship between financial development and ecological footprint using the panel data of 38 OIC countries over the period 1971-2017. The empirical results are estimated using panel data estimators. The findings reveal that financial development helps to improve the quality of environment by lowering ecological footprint in Muslim majority countries. However, the results also reveal that financial development is a source of high ecological footprint in affluent OIC countries. Thus, financial sector can contribute to 'linear economy paradigm' as well as 'circular economy paradigm' depending upon the priorities of financial sector. Findings of the study are shown to be robust to a number of robustness checks. The study offers important policy implications for the Muslim world.

Keywords: ecological footprint, environmental degradation, circular economy, financial development

1. Introduction

The contemporary world is confronted with two major challenges: achieving high economic development and preserving the earth's environment. The environmental degradation has become a global threat to humanity as a result of accumulation of greenhouse gases (GHGs) in the atmosphere. The rapid growth of industrialization over the past 200 years has resulted in a substantial rise in energy demand that is largely fulfilled by non-renewable fossil fuels. Accordingly, policy makers find it increasingly difficult to maintain the trade-off between economic development and environmental degradation.

In this background, the role of financial sector in influencing environment has become critical. Whereas financial sector has the power to improve the quality of environment, it can

also deteriorate environment. **Zhang (2011)** argues that financial development attracts more environmental-friendly projects through research and development. Financial development also facilitates the investment in energy efficient technologies such as renewable energy. Similarly, it can increase economic efficiency by reducing the capital risk and financial cost that minimize the overall resource inefficiency.

In contrast, financial development upsurges the environmental degradation by facilitating the credit facilities to the customers for purchasing electrical devices, automobiles, and houses. These facilities help the investors to expand their business horizons and set up new plants that in turn increase the carbon emissions **(Zhang and Zhang 2018; Danish *et al.*, 2018)**. Moreover, rise in foreign direct investment (FDI) in response to well-developed financial system also contributes to environmental degradation **(Sarkodie and Strezov, 2019)**.

A major weakness of these studies is that they rely on CO2 emissions as an indicator of environment (**Maji *et al.*, 2017)**. The carbon emissions are, however, a part of environmental degradation caused by large scale energy consumption **(Al-Mulali *et al.*, 2015)**. In contrast, the ecological footprint (EFP) is a more reliable indicator of anthropogenic pressure on the environment. It has certain strengths**.**

First, it is one of the comprehensive indicators of environmental quality. Second, it deals with the information of numerous natural resources that are required for the production and support of the overall economy (**Katircioglu et al., 2018)**. Third, it tracks the information about ecological deficit and surplus **(Castellani & Sala 2012).** Fourth, it provides the efficient measure of depleted natural resource reproduction by capturing the information regarding water and land **(Aydin et al. 2019)**. Fifth, by providing the information about resource metabolism, it allows the state/government to compare the economy's resource demand with its actual supply and handles the distributional process efficiently. Lastly, it can build the economy's competitiveness by monitoring resource supply/deficit **(Wackernagel et al., 2006)**.

Another issue with empirical literature is that the empirical studies generally focused on country specific evidence or regional base evidence. The studies have generally ignored developing world including Organization of Islamic Cooperation (OIC) countries. The developing world is more prone to be affected rapidly than developed countries. Since Muslim majority countries are geographically located within developing countries, assessment of their ecological issues is important. Islamic countries have declared their commitment to preserve the environment under the umbrella of the Organization of Islamic Cooperation.

The concerns of Muslim-majority countries about environmental protection are not clear. In recent decades, a rapid social change has been observed in many countries including

OIC countries. Traditional and religious norms, culture and care for environment have been declining. For example, some Islamic countries are blamed for wasteful consumption of food during the holy month of Ramadan (**Saniotis, 2012**). Some of Muslim countries are questioned for whether they have contaminated the image of Islam by escalating man-made environmental problems. Such problems include the devastation of the Aral Sea in Central Asia, desertification in Sub-Saharan Africa, exhaustion of oil deposits in the Middle East, deforestation, and loss of biodiversity in Islamic countries (**Kula, 2001**).

The literature has paid little attention to ecological issues of the OIC countries. This study contributes in the emerging literature on ecological aspects of finance by answering the following two questions. Does financial development reduce ecological footprint? Is the effect of financial development on ecological footprint different in affluent OIC countries?

The rest of the paper is organized as follows: section 2 describes the review of relevant literature; section 3 presents methodology and section 4 provides the data sources and statistical analysis; section 5 provides a discussion on empirical results. Section 6 concludes the discussion.

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2. Literature Review

E-government refers to implementations of ICT in public sector, planning and administration [Von (2004)]. In other words, the provision of rapid, convenient, efficient, and transparent services by the public sector through information technology is named as e-government [Tandon (2005), and Chen et al. (2009)]. The theoretical literature advocates a positive relationship between e-government and economic development. E-government helps to tap the actual potential of an economy by diffusion of knowledge and information.

2.1 Environmental Context of Islam

Allah, the Almighty, says in the Holy Quran (20:53-54): "He Who has spread out the earth for you and threaded roads for you therein and has sent down water from the sky: With it have We brought forth diverse kinds of vegetation. Eat and pasture your cattle; verily, in this are signs for men endued with understanding."

In effect, Allah has created diverse resources for the use and welfare of human beings. Islamic teachings refer to just and sustainable use of natural resources, whereas abstaining from extravagance and wastefulness. As believers, thus, Muslims are duty bound to achieve higher level of environmental preservation and conversation of natural resources (OIC Environment Report, 2017).

The religion of Islam is the third of Abrahamic religions and shares its religious heritage with Judaism and Christianity. Environmental context of early Islam was characterized by its simplicity and respect for nature. As Islam spread into different continents such as Asia, Africa and Europe during seventy century, it maintained its naturalistic approach. A fundamental feature of early Islam, which has informed Muslims for 14 centuries, is its emphasis on nature.

The Qur'an and the teachings of prophet (PBUH) are the main sources of Islamic environmental ethos that have been integrated within Islamic jurisprudence. Islamic ecological ethics base on three founding ideas that are *tawhid* (Divine unity), *khilafah* (trusteeship), and *akhirah* (the hereafter). The main implication of tawhid is that Allah is the creator of whole universe and that all existence reveals unity in plurality **(Dutton 1996; Saniotis 2004; Foltz et al. 2003)**.

"According to Muslim scholars, universe is governed and regulated by the principles of unity, balance and harmony that characterize the interactive unifying principle—tawhid" (**Saniotis, 2012)**. It is repeatedly quoted in Quran (14:19–20; 46:3; 15:85–86) that the universe characterize by proportion, harmony and beauty, which reflect Divine craftsmanship (**Saniotis 2004: 101; Wersal 1995: 453; Ozdemir 2003; Nasif 1987**). The universe is retained in balance, and it is controlled by the interdependency of ecological systems (**Wersal 1995: 453; Faruqi 1980: 24–31**). Therefore, "nature provides a source of inspiration and guidance for understanding Divine action in creation. In human terms, tawhid is the basis of human action and thought, penetrating every dimension of subjective and social life" **(Shariati, 1979)**.

Stewardship (Khilafah) is the second source of Islamic environmental ethics **(Idris 1990; Khalid and O'Brien 1992)**. The Qur'an declares humans as stewards of Allah's creation. "Behold, the Lord said to the angels: "I will create a vicegerent on earth" **(Qur'an 2:30)**. Moreover, humans need to abstain from mischief (actions leading to the corruption of

the environment). “Do no mischief on the earth after it hath been set in order, but call on him with fear and longing in your hearts: for the Mercy of God is always near to those who do good” **(Qur’an 7:56)**.

The importance of ecology in Islam is endorsed by the fact that one-eighth of the Qur’an urges Muslims to mediate on nature. **Khalid (1996)** highlights that the concept of stewardship implies that humans are friends of the earth, not its masters.

The third concept of Islamic environmental ethics is belief on hereafter life. It implies that humans are not only obliged as Allah’s steward on the earth, but also would be held accountable in the hereafter, if there is any straying. “Each generation of humans is obliged to improve the condition in which preceding generations have left the earth. No generation has a right to pollute the earth in a manner that depletes its resources and degrades its biological systems” **(Weeramantry, 1988: 61)**.

Scholars maintain that “humans have the rights and privileges of living from the earth in a sustainable manner” **Zaidi (1981: 35), Faruqi (1980: 30–31), and Ateshin (1989: 179)**. Qur’an and prophetic traditions explicitly recommend a criterion for responsible human trusteeship of the earth.

Islam, as a major world religion has been under-represented in contemporary environmental debates. **Foltz (2000)** considers environmental problems in the Muslim countries as an outcome of social injustice that is ubiquitous throughout the world. Muslim scholars consider usury-based banking system consider responsible for environmental degradation as this system rewards few at the costs of many.

This is because it encourages conspicuous and wasteful consumption. Ecological problems are reflectors of usury-driven global financial structure. According to political Islam, the contemporary environmental issues neither due to increasing population nor biblical misunderstanding, but these problems are outcomes of Western economic principles that have been leading the world economy for a long period **(see Kula, 2001)**. Scholars have explored Islamic perspectives of economics, law, politics and architecture. However, environmental concerns of Islam have received least attention **(Foltz, 2000)**. Even Muslim scholars discuss environmental issues generally relate to the Western orientation rather than to the environmental itself.

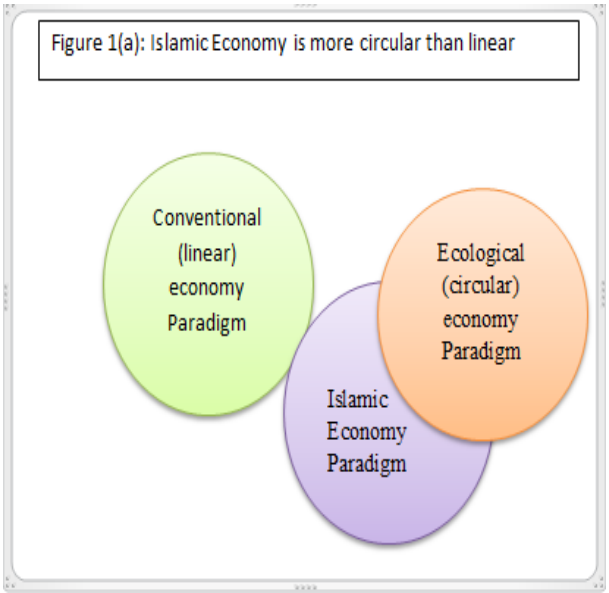
Khan (2019) considers liner economy responsible for environmental problems. He asserts that ‘the interest-based financial system essentially becomes as an engine for driving such a linear economy.’ He emphasizes the importance of ‘circular economy’ which takes care

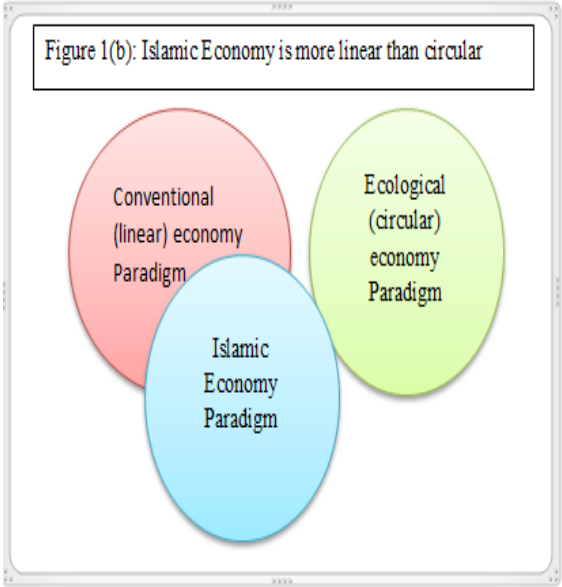
of ecological problems. He argues that Islamic economy can be both more and less circular (Figure 1). Moreover, Islamic economy can be neither linear nor circular (see Khan, 2019).

Hekmatpour (2017) explores how various dimensions of Islamic teaching and philosophy can contribute to protecting the natural environment. On the one hands, concepts such as "dominion of men over the earth" and "specialness of humankind" can lead to anti-environmental inferences of Islam. Moreover, a number of Islamic governments have shown a bias against environmental stewardship, mainly in cases when governments are authoritarian or placing emphasis on economic development. On the other hands, **Hekmatpour (2017)** also shows other interpretations of Islamic teaching that are compatible with environmental stewardship. Islamic Mysticism (Sufism) provides a spiritual context for environmentally conscious action.

Aboul-Enein (2018) explores references from Quran to explain the importance of environment in Islamic literature. "A total of 88 verses in 42 Quranic chapters were identified with a considerable emphasis placed on the importance of water resource management and water conservation, environmental justice, plant conservation, biodiversity, sustainability, and environmental stewardship. These results suggest that the Holy Quran could serve as best medium and educational resource for environmental health interventions in diverse populations, especially in Muslim communities and for improving and maintaining a healthy environment."

Helfaya (2018) reveals that seven environmental thematic groups have been promoted in the Quran that are human beings, water, air, land, plants, animals, and other natural resources. These seven identified themes have many ethical aspects such as the responsibility to use not abuse. Each of these elements have many implications for business practice such as abolishing abuse of women and child labor, reducing wastewater, decreasing air pollution and noise and preventing exploitation of natural resources. In a recent study, **Abdelzaher (2019)** advances the extant literature from the belief level of Islamic teaching related to ecology to the action level by addressing questions such as: can we take our belief of "Eco-Islam" to actually guide behaviors and outcomes.





2.2 Environmental Degradation and OIC Countries

According to OIC Environment Report (2017), environmental degradation is problem of the whole world but relatively its negative effects are more pronounced in developing countries. Being a substantial part of the developing world, OIC member countries are vulnerable to various climate related challenges. Majority of the OIC member countries is above medium level of environment vulnerability (Figure 2).

In effect, high environmental vulnerability of OIC countries attributed to their geographic locations, high dependence on climate sensitive natural resources and low adoptive capacities. Environmental issues of OIC countries pose serious economic and social challenges particularly for the disadvantaged and poor population.

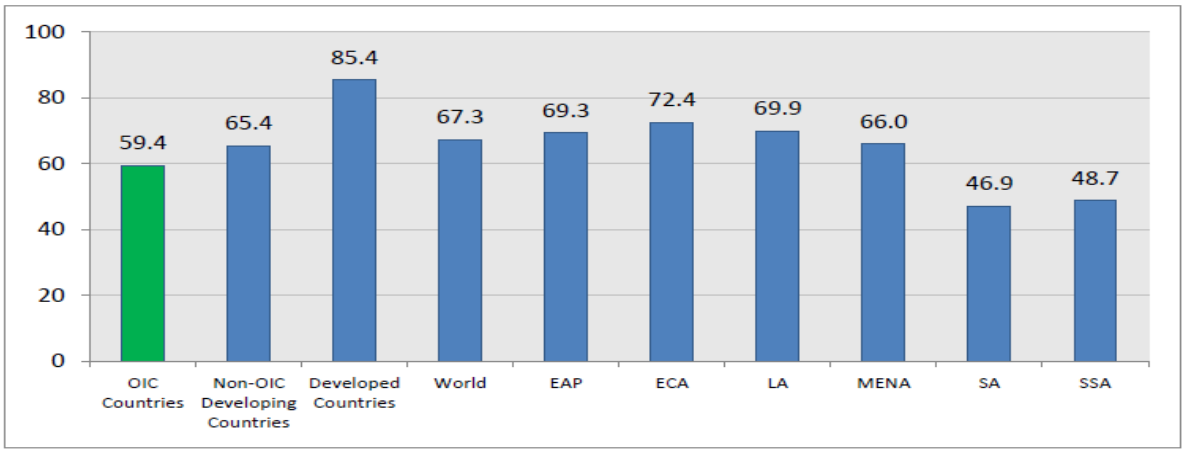
Kula (2001) argues that some of Muslim countries are questioned for whether they have contaminated the image of Islam by escalating man-made environmental problems. The problems related to environment in Islamic countries are considered as the product of social injustice such as lack of awareness of environmental issues (**Foltz, 2000**), and failing to compliance the principals of Quran and Prophetic teachings (**Foltz et al., 2003**).

Saniotis (2012) explores different aspects of Muslim environmentalism to answer the question that how Islamic environmental ethics influence environmental practices. He concludes that "while Islam provides detailed ethical principles on the environment, the majority of Muslim majority countries show an apparent indifference to environmental issues."

Muslim majority countries are going through rapid social change that challenges conventional cultural norms. Consequently, various socio-political tensions have arisen in

many Muslim majority countries. Ecological degradation in various Muslim majority countries is related to social change **(Saniotis, 2012)**. **Ismail et al. (2019)** explore the different aspects of environmental performance for high income countries of the Muslim world. Their study provides evidence that majority of the rich Muslim countries were in the rank of "taking environmental performance as unimportant". Thus, environmental degradation is an important challenge in the Muslim world.

Figure 2: Environmental Performance of OIC Countries



Source: OIC Environment Repot (2017)

2.3 Environment and Financial Development Nexus

The literature on financial development and environment is not yet conclusive. Earlier studies highlighted the role of multilateral banks in affecting the environmental quality. **Aufderheide & Rich (1988)** argued that World Bank's financial assistance and mechanism often ignore the environmental impact of the loanable funds and lead to serious environmental concerns. For example, in the case of India, financing the energy capital increased soil erosion, the Grand Bereby rubber project resulted in tropical forestland deterioration and micro-finance for the cotton production led the projected agriculture land useless by exhausting the soil. Similarly, **Schmidheiny & Zorraquin (1998)** concluded that more often financial institutions encouraged short-term goals and ignore the environmental risks, leading to higher natural resource exploitations.

Tadesse (2007) and **Kumbaroglu et al. (2008)** argued that financial development helps to control pollutant emissions by encouraging the technological innovations in the energy sector. Similarly, **Lanoie et al. (1998)** and **Tamazian et al. (2009)** argued that well-developed financial system mainly capital markets help to improve environment by increasing R&D expenditures on energy efficient technology.

Using the annual data of Turkey from 1960-2013, **Dar and Asif (2018)** also confirmed favorable impact of financial development on environment. Likewise, using a sample of ASIAN-5 economies over the period 2000 to 2014, **Hamdan et al. (2018),** confirmed that financial development helps to improve the environmental quality by channelizing the technological transformation through attracting FDI.

Recently, **Mohammed et al. (2019)** found favorable impact of financial development on environment of Venezuela from 1971-2013. Their finding suggested that well-developed financial institutions reduce the financing cost (i.e. information asymmetry) by channelizing the resource in to new and energy efficient technology. Similarly, **Seetanah et al. (2019)** confirmed that financial development is beneficial for environmental quality of selected 12 Island developing economies from 2000 to 2016.

Apart from affirmative effects of financial development on environmental quality studies also identified the detrimental effects of financial development on environment. **Moghadam & Dehbashi (2018)** pointed out undesirable effects of financial development on environmental quality of Iran over the period of 1970-2011. **Mesagan & Nwachukwu (2018)** also found similar results for Nigeria from 1981to 2016. Similarly, **Moghadam & Dehbashi (2018)** found out that financial development deteriorates the environmental quality by increasing the industrial activities in Iran over the period 1970-2011.

Recently, **Ganda (2019)** concluded for OECD countries that the impact of domestic credit to private sector by banks is favorable for the environmental quality, while the impact of domestic credit to private sector and FDI is worsening. Similarly, **Bloach et al. (2019)** showed the detrimental effect of financial development on environmental quality for BRI countries.

Thus, financial development plays a crucial role in influencing the environmental quality. However, the empirical results of financial development on environmental quality are inconclusive. This study contributes in the existing literature by exploiting the more comprehensive indicator of environmental degradation and using three measures of financial development for OIC countries from 1971 to 2017.

E-government refers to implementations of ICT in public sector, planning and administration [Von (2004)]. In other words, the provision of rapid, convenient, efficient, and transparent services by the public sector through information technology is named as e-government [Tandon (2005), and Chen et al. (2009)]. The theoretical literature advocates a positive relationship between e-government and economic development. E-government helps to tap the actual potential of an economy by diffusion of knowledge and information

3. Methodology

Following the empirical literature on financial development and quality of environment following econometric model is used for regression analysis:

$$EFP_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 LEC_{it} + \beta_3 LGDP_{it} + \beta_4 URB_{it} + \beta_5 FDI_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots (1)$$

Where, t represents the time period and i represent the cross sections. EFP shows ecological footprint measured in global hectares (GHA) per person **(see Katircioglu et al., 2018)**. It is proposed to highlight the natural resource consumption and the productive capacity of the ecosystem (**Aydin et al., 2019)**. "*Ecological Footprint accounts act as balance sheets by documenting for a given population – a household, a district, a city, a region or humanity as a whole – the area of biologically productive land and sea required to produce the renewable resources this population consumes and assimilate the waste it generates, using prevailing technology. It documents the extent to which human economies stay within the regenerative capacity of the biosphere. Overall, it is the sum of built-up land, carbon, cropland, fishing grounds, forest products and grazing land."*

FD represents the financial development. LEC represents the log of energy consumption (LEC) measured in terms of kg of oil equivalent per capita. If energy is efficiently utilized and used in green technologies then it helps to reduce the harmful environmental effects **(Stern et al. 2006)**. While the higher amount of energy use in terms of higher demand for gas, oil and coal contributes to the pollutant emissions along with the resource degradation.

LGDP represents the log of GDP per capita constant 2010 US dollars (economic growth). It can affect the environment through three channels. First, it increases the environmental degradation as inputs utilization increases for the higher production (**scale effect**). Second, with the composite change of growth path from agriculture to the industrial sector environmental deterioration increases initially and then declines in the later stage with the expansion of service sector (**composite effect**). Lastly, technological advancement helps to curb the pollutant emissions by introducing the green technology (**technique effect**) **(Stokey, 1998)**.

URB represents urbanization measured through the urban population as a percentage of total population (URB). Urbanization increases the environmental degradation by increasing the energy and resource demand and their consumption (**Wang et al. 2016**). However, urbanization increases the economies of scale and boosts the green technology in the long run that reduces the resource inefficiency and improves the environmental quality**.**

Lastly, FDI inflows as a percentage of GDP incorporated in the model. Foreign enterprises use cleaner technologies following the environmental protection laws and promote R&D in the energy-efficient technology, thus leading to higher environmental quality **(Asghari, 2013)**. This relationship is referred as "pollution halo hypothesis". However, FDI can increase greenhouse gas emissions in the economies having weak environmental protection laws, poor infrastructure and weak institutional framework (**Solarin et al., 2018)**. This relationship is referred as "pollution heaven hypothesis". The term μ_{it} is the error term that captures the effect of all omitted variables.

Three measures of financial development are used. First measure is domestic credit by the private sector as percentage of GDP (**FDP**). "*It refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment."*

The second measure is domestic credit to private sector by banks as percentage of GDP (**FDB**). *"It refers to the financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment."*

Finally, the last proxy for the financial development is the domestic credit to private sector provided by the financial sector (**FDF**). "*It includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net."* Since alternative measures of financial development are highly correlated, their effects are estimated separately using equations 1.1-1.3.

$$EFP_{it} = \beta_0 + \beta_1 FDP_{it} + \beta_2 LEC_{it} + \beta_3 LGDP_{it} + \beta_4 URB_{it} + \beta_5 FDI_{it} + \mu_{it} \text{ ....(1.1)}$$

$$EFP_{it} = \beta_0 + \beta_1 FDB_{it} + \beta_2 LEC_{it} + \beta_3 LGDP_{it} + \beta_4 URB_{it} + \beta_5 FDI_{it} + \mu_{it} \text{ ....(1.2)}$$

$$EFP_{it} = \beta_0 + \beta_1 FDF_{it} + \beta_2 LEC_{it} + \beta_3 LGDP_{it} + \beta_4 URB_{it} + \beta_5 FDI_{it} + \mu_{it} \text{ ....(1.3)}$$

4. The Data and Descriptive Analysis

This study used the panel data over the period 1971-2017 for 38 OIC countries. The data for all variables is extracted from **World Bank (2018)** except ecological footprint which is collected from **Global Footprint Network (2018).** Table 1 reports the descriptive statistics. The minimum value of ecological footprint is 0.46472 that belongs to Bangladesh while maximum value is 16.85575 for the economy of Qatar. Malaysia has the highest value

(158.505) for financial development by private sector, whereas Azerbaijan has the lowest value (1.166).

Table 1: Descriptive Statistics

Variables	Observations	Mean	Median	Maximum	Minimum	Std. Dev.
Ecological Footprint	1030	2.692653	1.478062	16.85575 (Qatar)	0.46472 (Bangladesh)	3.032052
FDP	1030	30.731	23.65746	158.5048 (Malaysia)	1.166062 (Azerbaijan)	24.41741
FDB	1030	29.90155	22.94997	154.8921 (Malaysia)	0.934711 (Guinea-Bissau)	23.76886
FDF	1030	40.56419	31.27476	265.8643 (Guyana)	-65.2613 (Libya)	35.29246
Energy Consumption	1030	2011.37	645.8924	21959.44 (Qatar)	63.00522 (Guinea-Bissau)	3465.325
GDP	1030	7750.551	2178.899	113682 (UAE)	161.8338 (Mozambique)	15023.92
Urbanization	1030	50.53858	46.671	100 (Kuwait)	9.034 (Bangladesh)	21.39468
FDI	1030	2.658919	1.285496	55.0759 (Azerbaijan)	-15.6172 (Suriname)	5.044606

Table 2 presents the correlation between ecological footprint and financial development along with other explanatory variables. All indictors of financial development have positive correlation with ecological footprint. The correlation between financial development by the bank and ecological footprint is relatively high (0.302).

Table 2: Correlation Matrix

Correlation Probability	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ecological FP	1.000 -----							
DCP	0.285 0.000	1.000 -----						
DCB	0.302 0.000	0.994 0.000	1.000 -----					
DCF	0.129 0.000	0.827 0.000 0	0.823 0.000	1.000 -----				
Energy Con.	0.935 0.000	0.211 0.000	0.229 0.000	0.061 0.051	1.000 -----			
GDP	0.868 0.000	0.164 0.000	0.179 0.000	0.061 0.051	0.867 0.000	1.000 -----		
Urbanization	0.723 0.000	0.477 0.000	0.487 0.000	0.348 0.000	0.699 0.000	0.633 0.000	1.000 -----	
FDI	0.054 0.082	0.093 0.002	0.092 0.003	0.085 0.006	0.046 4 0.139 1	- 0.032 0.297	0.092 0.003	1.000 -----

5. Results and Discussion

Table 3 shows that financial development improves environment by lowering ecological footprint. The coefficients infer that 1 percent increase in FDP, FDB, and FDF will bring about 0.0040, 0.0038 and 0.0028 percent decline in ecological footprint, respectively. These findings are consistent with the findings of **Zhang (2011) and Mohammed et al. (2019)** who argue that well-developed financial institutions facilitate the funds for energy-saving and environmental-friendly projects. Contrary, financial develop worsens environment by increasing ecological footprint in affluent[93] OIC countries.

[93] High Income Countries, World Bank (2018).

Table 3: Results of Pooled OLS

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All OIC			**Affluent**		
DCP	-0.00404*			0.0802***		
	(0.00232)			(0.00423)		
DCB		-0.00380*			0.0803***	
		(0.00239)			(0.00423)	
DCF			-0.00283*			0.0643***
			(0.00155)			(0.00349)
Energy Con.	1.803***	1.806***	1.761***	1.085***	1.085***	1.297***
	(0.110)	(0.110)	(0.112)	(0.102)	(0.102)	(0.0984)
GDP	0.478***	0.478***	0.499***	0.393***	0.393***	0.390***
	(0.106)	(0.106)	(0.106)	(0.0914)	(0.0914)	(0.0918)
Urbanization	-0.00953*	-0.00984*	-0.00930*	-0.00645	-0.00647	-0.0111**
	(0.00525)	(0.00524)	(0.00526)	(0.00434)	(0.00434)	(0.00435)
FDI	-0.00910	-0.00925	-0.00896	0.00671	0.00673	0.00560
	(0.0102)	(0.0102)	(0.0102)	(0.00883)	(0.00883)	(0.00887)
Constant	-12.57***	-12.59***	-12.47***	-7.850***	-7.849***	-8.909***
	(0.416)	(0.416)	(0.421)	(0.437)	(0.437)	(0.411)
	Results of Post-Estimation Tests					
VIF	4.73	4.73	4.81	5.06	5.06	4.86.06

Wooldridge's Test	29.364	29.318	29.395	29.364	29.318	29.395
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BPG Test	532.97	529.83	557.26	1335.04	1334.91	1050.41
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,017	1,017	1,019	1,017	1,017	1,019
R-squared	0.731	0.731	0.732	0.801	0.801	0.799

Notes: (1) Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

(2) DCP (Domestic-Credit-Private), DCB (Domestic-Credit-Bank), DCF (Domestic-Credit-Financial-Sector).

The effect of energy consumption is significant and positive at 10 percent level of significance. The coefficient of GDP is positive and significant in all estimated model implying that economic growth (GDP) contributes to ecological footprint. This is consistent with the studies of **Moghadam & Dehbashi (2018) and Bloach et al. (2019)**.

The effect of urbanization on ecological footprint is negative and significant. This finding supports the **compact city theory** that higher urbanization improves the environmental quality by increasing the productivity, efficiency and economies of scale in public infrastructure. Lastly, the estimated effect of FDI on ecological footprint turned out to be statistically insignificant.

The values of R_2 are quite high and satisfactory (0.73 to 0.80). The probability value of F test is also significant providing the evidence of best model fit. The multicollinearity test suggests that VIF is less than 10 in all models indicating that the data is free from multicollinearity problem. Breusch-Pagan-Godfrey (BPG) test indicates the presence of heteroskedasticity that is tackled through the robust regressions and system GMM.

Pooled OLS treats all cross sections homogeneous and ignores the significant temporal and country effects. To capture these unobserved country specific fixed and random effects, fixed effects and random effects models are used. Tables 4 and 5 provide the results of the fixed and random effects models, respectively. Based on Hausman test, fixed effects model is appropriate for affluent OIC countries while random effects model is suitable for all OIC countries. Overall, results confirm baseline findings. However, the results are relatively sensitive to different measures of financial development.

Table 4: Results of Fixed Effects

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
		All OIC			**Affluent OIC**	
FDP	0.00292*			0.0137***		
	(0.00173)			(0.00453)		
FDB		0.00300*			0.0137***	
		(0.00175)			(0.00453)	
FDF			-0.00239**			-0.000217
			(0.00117)			(0.00291)
Energy Consumption	1.914***	1.914***	1.985***	1.945***	1.945***	1.955***
	(0.133)	(0.133)	(0.131)	(0.130)	(0.130)	(0.130)
GDP	-0.0856	-0.0861	0.00223	0.0335	0.0333	-0.0295
	(0.112)	(0.112)	(0.108)	(0.108)	(0.108)	(0.108)
Urbanization	-0.0201***	-0.0201***	-0.0205***	-0.0223***	-0.0223***	-0.0205***
	(0.00479)	(0.00479)	(0.00477)	(0.00479)	(0.00479)	(0.00482)
FDI	0.000228	0.000175	0.000811	0.000119	0.000121	0.000634
	(0.00519)	(0.00519)	(0.00517)	(0.00517)	(0.00517)	(0.00519)
Constant	-8.576***	-8.573***	-9.533***	-9.601***	-9.601***	-9.175***
	(0.890)	(0.889)	(0.820)	(0.811)	(0.811)	(0.811)

Observations	1,017	1,017	1,019	1,017	1,017	1,019
R-squared	0.286	0.286	0.285	0.291	0.291	0.282
Hausman Test	7.09	7.01	5.73	31.81	32.12	31.81
	(0.2144)	(0.2197)	(0.3334)	(0.0000)	(0.0000)	(0.0000)
Number of id	38	38	38	38	38	38

Table 5: Results of Random Effects

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All OIC			**Affluent**		
FDP	0.00238			0.0174***		
	(0.00169)			(0.00436)		
FDB		0.00246			0.0174***	
		(0.00172)			(0.00435)	
FDF			-0.00241**			0.00320
			(0.00116)			(0.00286)
Energy Consumption	1.908***	1.908***	1.957***	1.880***	1.880***	1.906***
	(0.127)	(0.127)	(0.126)	(0.124)	(0.124)	(0.124)
GDP	-0.0184	-0.0193	0.0489	0.0978	0.0977	0.0711
	(0.107)	(0.107)	(0.104)	(0.103)	(0.103)	(0.103)
Urbanization	-0.0195***	-0.0195***	-0.0195***	-0.0206***	-0.0206***	-0.0193***
	(0.00466)	(0.00466)	(0.00465)	(0.00463)	(0.00463)	(0.00466)
FDI	-0.000256	-0.000302	0.000376	-0.000429	-0.000429	-0.000411
	(0.00517)	(0.00518)	(0.00516)	(0.00518)	(0.00518)	(0.00524)

Constant	-8.888***	-8.878***	-9.591***	-9.605***	-9.605***	-9.550***
	(0.853)	(0.853)	(0.803)	(0.747)	(0.747)	(0.732)
Observations	1,017	1,017	1,019	1,017	1,017	1,019
Number of id	38	38	38	38	38	38

Table 6 illustrates the regression results of Driscoll-Kraay standard errors for pooled OLS, which deals with the issues of temporal and cross sectional dependence. The baseline findings remain same.

Table 6: Results of Driscoll-Kraay Standard Errors

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All OIC			**Affluent**		
FDP	-0.00404***			0.0802***		
	(0.00237)			(0.00810)		
FDB		-0.00380***			0.0803***	
		(0.00256)			(0.00810)	
FDF			-0.00283			0.0643***
			(0.00290)			(0.00900)
Energy Consumption	1.803***	1.806***	1.761***	1.085***	1.085***	1.297***
	(0.141)	(0.141)	(0.136)	(0.156)	(0.156)	(0.208)
GDP	0.478***	0.478***	0.499***	0.393***	0.393***	0.390***
	(0.110)	(0.110)	(0.103)	(0.0720)	(0.0721)	(0.0942)
Urbanization	-0.00953	-0.00984	-0.00930	-0.00645	-0.00647	-0.0111*
	(0.00667	(0.00669)	(0.00725	(0.00550)	(0.00550)	(0.00578)

	)		)			
FDI	-0.00910	-0.00925	-0.00896	0.00671	0.00673	0.00560
	(0.0102)	(0.0102)	(0.00948)	(0.00983)	(0.00983)	(0.0115)
			)			
Constant	-12.57***	-12.59***	-12.47***	-7.850***	-7.849***	-8.909***
	(0.617)	(0.615)	(0.639)	(0.793)	(0.793)	(0.966)
Observations	1,017	1,017	1,019	1,017	1,017	1,019
R-squared	0.731	0.731	0.732	0.801	0.801	0.799
Number of groups	38	38	38	38	38	38

The problem of endogeneity is resolved by incorporating the instruments in the model using the system GMM. We take the lag of dependent variable as endogenous instruments along with the lag value of explanatory variable and time dummy as exogenous instrument. The results (Table 8) indicate that all indictors of financial development have a negative relationship with ecological footprint and statistically significant in all estimated specifications. Hanen test confirms the overall validity of instruments. Moreover, the insignificant value of AR (2) indicates that error term is uncorrelated and problem of serial correlation does not arise.

Table 8: Results of System GMM

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All OIC			**Affluent-OIC**		
FDP	-0.00566***			0.0345***		
	(0.000901)			(0.000893		

			)			
FDB		-0.00735***			0.0345***	
		(0.000801)			(0.000893)	
FDF			0.00111***			0.0165***
			(0.000380)			(0.000784)
Energy Consumption	3.072***	2.986***	3.024***	2.611***	2.610***	2.938***
	(0.0867)	(0.108)	(0.0840)	(0.0577)	(0.0577)	(0.0863)
GDP	0.388***	0.417***	0.405***	0.565***	0.565***	0.348***
	(0.0945)	(0.0924)	(0.105)	(0.0714)	(0.0714)	(0.0754)
Urbanization	-0.0357***	-0.0333***	-0.0400***	-0.0473***	-0.0473***	-0.0455***
	(0.00502)	(0.00487)	(0.00401)	(0.00293)	(0.00293)	(0.00370)
FDI	-0.0401***	-0.0402***	-0.0421***	-0.0255***	-0.0255***	-0.0327***
	(0.000977)	(0.000885)	(0.00132)	(0.00156)	(0.00156)	(0.000988)
Constant	-18.90***	-18.56***	-18.58***	-17.07***	-17.07***	-17.34***
	(0.372)	(0.392)	(0.623)	(0.392)	(0.392)	(0.612)
Observations	998	998	1,000	998	998	1,000
Number of id	38	38	38	38	38	38
AR (1) Pr>	0.824	0.839	0.774	0.697	0.696	0.832

z						
AR (2) Pr> z	0.685	0.652	0.644	0.751	0.750	0.735
Hansen Test	0.555	0.990	0.990	0.990	0.990	0.990

5.6. Sensitivity Analysis

To check the robustness of findings, the sensitivity analysis is conducted using two additional explanatory variables namely trade openness and population growth. The, sensitivity analysis also confirmed the robustness of the results.

Table 8: Sensitivity Analysis of Variables

Sensitivity Variables				
Variables	**Trade Openness**	**Population Growth**	**Trade Openness**	**Population Growth**
Dependent Variable: EFP (1971-2017)				
	Full Sample	Full Sample	Affluent OIC	Affluent OIC
FD Private Sector	-.0085688 ***	-.00471**	.0565542 ***	.081222***
	(0.000)	(0.016)	(0.000)	(0.000)
R-Squared	0.73	0.81	0.84	0.82
FD Banking Sector	-.00807***	-.00522**	.056616***	.081282***
	(0.001)	(0.009)	(0.000)	(0.000)
R-Squared	0.73	0.81	0.84	0.82
FD Financial Sector	-.003312 ***	-.00365**	.0450725***	.06634***
	(0.025)	(0.005)	(0.000)	(0.000)
R-Squared	0.73	0.81	0.84	0.82

6. Conclusion

This study investigates the relationship between financial development and environment using ecological footprint as a comprehensive measure of environmental degradation. The analysis covers the large panel data set of 38 OIC countries for the period of 1971-2017. The empirical investigation is based on pooled OLS, random and fixed effects models, Driscoll-Kraay standard errors and system GMM.

The findings reveal that financial development helps to improve the quality of environmental by lowering the overall ecological footprint. In this context, one very important implication is drawn from the findings that if financial institutions are more concerned about environmental preservation than they will provide loans and relaxation to the industries which are adopting energy-saving technologies. Moreover, they will also assist the funding for the R&D of green technologies that in turn help to improve the environmental quality.

Finally, in affluent OIC countries financial development turns out to be the source of increasing ecological footprint. This finding implies that the impact of financial development on ecological footprint varies depending upon the prosperity level of OIC countries. That is financial development causes the reduction in overall ecological footprint only if it supports environmental-friendly projects and investment.

Overall, financial sector tend to contribute to circular economy paradigm by improving the quality of environment. In affluent OIC countries, financial sector tend to contribute to linear economy paradigm by compromising the quality of environment. Thus, priorities of financial sector towards environmental friendly financing can help to preserve the earth's environment.

This study has certain limitations. First, the sample size is limited to 38 OIC countries because of missing data series of ecological footprint and energy consumption. Second, the findings of study are generalized for OIC countries as a group, whereas individual country may differ from these findings depending upon country specific conditions. Third, this study focuses on overall financial development whereas Islamic finance is also an important development in OIC countries.

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SESSION VII:
CIRCULAR ECONOMY INNOVATIONS - CASE

Circular Economy and Development

Jameela Mohammed Alshaabi

The Sustainable Development Goals are a blueprint for achieving a better and more sustainable future for all, addressing the global challenges they face, including those related to poverty, education, economic decline and interdependence of development goals. The 2030 Agenda for Sustainable Development, adopted by all UN member states In 2015, a joint plan for peace and prosperity for people and the planet as a whole, now and in the future.

At its core, the SDGs are an urgent call for action by all countries -developed and developing- in a global partnership. They recognize that ending poverty and other deprivation must go hand in hand with strategies that improve health and education, reduce inequality, and stimulate economic growth - all while addressing climate change and working to conserve our oceans and forests.

The sustainable development goals depend on decades of work by countries and the United Nations, including the Department of Economic and Social Affairs. The concept of sustainable development came as an alternative and expanded concept to previous development concepts, where the essence of this concept is how to achieve economic development and social welfare with the least amount of natural resources consumed and minimal pollution and environmental damage (Wadfal 2016).

The State of Qatar has been concerned with sustainable development since its independence in 1971, where the focus has been the three dimensions of sustainability, namely: social, economic and environmental development. The state has established over the decades many governmental institutions and agencies targeting sustainable development, such as the Supreme Council for Planning, the General Secretariat for Development Planning, and the Ministry of Development Planning and Statistics. In 2008, Qatar government launched Qatar Vision 2030, which is based on four pillars: human development, Social development, economic development, and environmental development. This vision seeks to improve all aspects of life in Qatar (Voluntary National Review 2017).

Circular Economy in Qatar: Case Study of Used Tires

Khalid Al-Ansari and Tariqullah Khan

Cars use wheels made of rubber (tires) to soften the transportation movement's sensation on the passenger of any car. Tires normally come with every car that we purchase, and we use the tires until they wear out in three or four years. Then we replace the worn out tires with new ones for driving safety considerations (such as safe stopping distance as well as directional stability). When we buy the new tires, the old ones are taken by the workshop and sent to the local landfill as waste product. Landfills are normally remote areas where it store stacks of the tires in piles. Some of the landfill are segregated in that they only store tires, and other landfills can store tires in one side of the landfill, and other domestic and municipal waste in the other sides of the landfill.

In this research paper, I will attempt to answer the question of what can be done with the used tires in an economically sustainable and environment-friendly manner. The methodology would look at the life cycle of the tire and attempt to put the different products contained within the used tires, back into the economy to get another use of them.

The second part of this paper would present the normal life-cycle of a tire in many parts of the world and will evaluate the four (4) phases of a tire from creation to disposal.

The third part will present best practices (i.e. shredding, retreading) and then looks at how UK and Canada took the matter further to encourage the re-use of tire products (new life of the tire after its end of life is reached). It will also highlight what is the practice of the Government of Qatar in combating the tire accumulation problem.

Electronic and Electrical Waste Management: Sweden and Malaysian Experiences

Eiman I. Hassan and Nasim Shirazi

Abstract

The production and consumption of electronic/electrical devices are rapidly increasing and generating social, economic, cultural, and scientific benefits globally. However, this leads to an increase in the amounts of disposal, obsolete, defected, or broken devices. Electronic Waste (E-Waste) stream is growing very fast in the world, and it contains hazardous chemicals materials, which if not appropriately managed will negatively affect human health and the environment (Zhao, et al, 2019). The same waste also represents an opportunity and yields social, environmental, and economic benefits if it is well managed, treated, and reused. According to the same report, the value of e-waste material globally is approximately $62.5 billion annually. Waste recycling contributes to climate change mitigation and creates green jobs. Eight out of the 17 Sustainable Development Goals (SDGs) are with targets relatively linked to e-waste management. Most E-Waste is generated by developed countries, while the majority of it is disposed and dumped in less developing countries.

This paper compares the implementation of the SDGs that are linked to e-waste between Malaysia, which has fair experience of the implementation of SDGs and has a large electric and electronic equipment (EEE) manufacturing industry, and Sweden, which is considered the leader of implementing SDGs as of 2018 and one of the most efficient e-waste collector in the world. Content analysis of related UN reports and annual reports from Basel Convention (BC) for controlling transboundary movements of hazardous wastes and their disposal, including e-waste, is conducted. The analysis revealed that Sweden success is due to the implementation of the "Extended Producer Responsibility" and the cooperation of the different stakeholders. Malaysia, on the other hand, is improving. The country is experienced in e-waste management since 2005. However, further efforts are still needed by different stakeholders of the country, especially in the management of the household's e-waste.

The success of Sweden in e-waste management results from the close cooperation among the municipalities, producers of the e-goods, recycling centers, and the high awareness of the Sweeden people regarding the importance of waste management. The other countries may learn from the experience of Sweeden in e-waste management, and practice so that the globe may achieve targets set in SDGs and consequently circular vision of e-waste

***Keywords**: e-waste, hazardous waste, SDGs, Basel convention, circular vision*

Introduction

The World Economic Forum defines e-waste as anything with batteries, plug, or electrical cord that reached the end of its lifetime. It is also called Waste Electrical and Electronic Equipment (WEEE). E-Waste is generated from different sources: households, business, and governments. It includes precious and rare materials that can be reused in manufacturing new products if it is adequately recycled (Zhao, et al. 2019). Another definition divides e-waste into six categories: 1. Temperature exchange devices, e.g., refrigerators and air conditioners, 2. Screens and monitors, laptops, notebooks, and televisions. 3. Lamps: fluorescent lamps, LED lamps. 4. Large equipment: includes washing machines, electric stove, large printing machines. 5. Small equipment: like microwaves, video cameras, electric toys. 6. Small telecommunication and IT equipment: such as mobile phones, routers, personal computers. The percentages of these categories in 2016 are summarized in the below table (Baldé, et al. 2017):

Table 2: E-Waste Categories and Volumes (Million Tonnes-MT) as of 2016

E-waste Type	Temp. exchange equipment	Screens and monitors	Lamps	Small equipment	Small telecom & IT	Large equipment	Total (MT)
Volumes (MT)	7.6	6.6	0.7	16.8	3.9	9.1	44.7
Percentage (%)	17	14.77	1.57	37.58	8.72	20.36	100

Source: Global e-waste monitor 2017

From the above table, small equipment represented the highest percentage of e-waste (37.58), and lamps represented the lowest percentage (1.57).

E-Waste Problem

According to the above table, the total volume of E-Waste generated globally in 2016 was 44.7 million tonnes (MT), 40 MT of this amount (almost 89.5%) is typically discarded in landfills, burned or illegally traded. Only 10.5 % of e-waste is considered adequately managed and documented to be collected and recycled. The volume of e-waste generated in 2018 is estimated to be 50 MT (Drayton 2007).

The distribution of e-waste by region is shown in table 2:

Table 2: Regional E-Waste Status 2016

Region	Amount of e-waste generated (MT)	% of e-waste generated	A country with highest e-waste generation	E-waste amount by top country (MT)	Amount of e-waste collected/recycled (MT)	E-waste collection rate
Africa	2.2	5%	Egypt	0.5	0.004	0%
The Americas	11.3	25.3%	USA	6.3	1.9	17%
Asia	18.2	40.7%	China	7.2	2.7	15%
Europe	12.3	27.5%	Germany	1.9	4.3	35%
Oceania	0.7	1.6%	Australia	0.57	0.04	6%

Source: Global-E-waste_Monitor 2017

Table 2 shows that the lowest e-waste is generated in Oceania (0.7MT) which is 1.6% of the e-waste generated globally and the highest is generated in Asia (18.2 MT) which is 40.7% of the total e-waste worldwide. However, the collection and recycling rate of e-waste by region is highest in Europe (4.3 MT) which is 35% and the lowest in Africa with almost negligible collection rate.

The forecast for e-waste volumes for the years 2021 and 2050 based on the assumption of the increased population growth and the justifiable increase of the consumption of electronic/electrical devices are 52 MT and 120 MT respectively, which is almost triple the volume, This increasing level of e-waste is also forecasted to increase the total carbon emission from electronic devices by 14% (Baldé, et al. 2017). According to the Basel Convention (BC)[94], although e-waste contains valuable metals such as gold, copper, and nickel. It also contains very toxic materials such as lead, mercury, and brominated flame retardants. Hence, BC considered e-waste as hazardous waste. BC documented that e-waste was shipped to developing countries and was not appropriately treated in these countries, which caused severe human health and environmental issues. Hence, e-waste is causing severe risks to human health

94 http://www.basel.int/Implementation/Ewaste/Overview/tabid/4063/Default.aspx

and the environment, in addition to presenting several challenges to achieving sustainable development goals by 2030 (Drayton 2007)

E-Waste management opportunities

Electric and Electronic Equipment (EEE) contains different materials such as gold, silver, platinum, copper, and more. For example, the gold that found in a tonne of smartphones is 100 times more than the gold found in gold ore. According to the latest forecast e-waste worth about $62.5 billion annually, which is more than the GDP of many countries. The value of only recycled raw materials could value up to $11.5 billion (Zhao, et al. 2019).

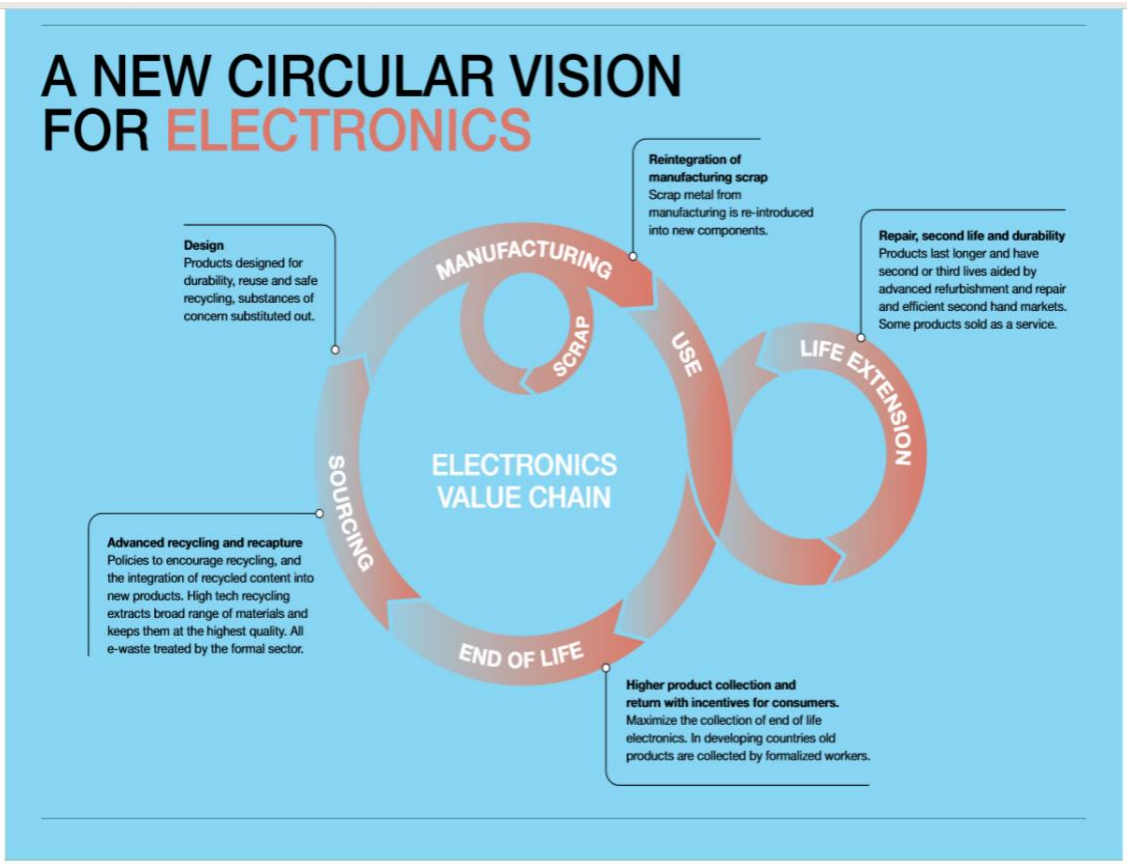
As an example, each smartphone contains electrical materials worth more than $100.49. (references is needed) According to the recent statistics from Malaysia, there are 17.2 million smartphone users[95] that mean about $1.7 billion worth of materials in a wasted smartphone.

The recovery of the precious resources from e-waste yields economic benefits. E-waste entrepreneurs and cooperatives are practicing new business models for managing e-waste, which result in expanding the business and creating thousands of safe jobs.

Zero E-Waste Circular Economy

The 2019 report by World Economic Forum emphasizes the importance of implementing different business models to achieve a circular economy where waste is designed out of the system. The business models suggested are Product as a service (e.g., Fairphone circular mobile phone company in the Netherlands launched, Fairphone-as- a –service and Dell company in the US has PC as a service), life extension, sharing of assets and recycling models. To accomplish the circular economy for EEE, the following aspects need to be reconsidered: Product design should be durable, reusable, and safe recycling; Incentivized consumers financially and guaranteeing safe handling of their personal data in the old equipment to encourage buyback or return policy; Governments and companies work together to enhance EEE collection and recycling processes by creating a system for close loop production in which all EEEW is collected, and the materials are reused in the manufacturing of new products. All countries need to invest heavily in technology that assists in extracting metals and minerals from e-waste, and they need to develop e-waste legislation, such as extended producer responsibility and build recycling industry formally, this will create opportunities for economic growth and more jobs as well (see figure below).

95 https://www.statista.com/statistics/494587/smartphone-users-in-malaysia/



Source: (Zhao, et al. 2019), Members of PACE and the UN E-Waste Coalition, 2019

E-Waste and SDGs

The United Nations 2030 agenda adopted seventeen Sustainable Development Goals (SDGs) with specified goals/targets and some indicators[96]. Below is a summary of some SDGs goals/targets that are relatively linked to e-waste:

SDG 1.5 is concerned about the exposure of the poor and vulnerable to climate-related extreme events and other economic and environmental issues; the target is to build the resilience of the poor.

SDG 2.1 is concerned about ending hunger by providing safe, nutritious, and sufficient food to all people, especially poor people in the vulnerable situation, including infants.

SDG 3.9 aims at reducing the number of deaths and illnesses as a result of hazardous chemicals and water, air, and soil contamination and pollution.

96 https://www.un.org/development/desa/disabilities/envision2030-goal14.html

SDG 6.1 refers to achieving universal and equitable access to safe and affordable drinking water. SDG 6.3 targeting water quality, by reducing pollution and eliminating/minimizing dumping of hazardous chemicals and materials.

SDG 8.8: Promoting a safe and secure working place for all workers

SDG 11.6: Concerned with air quality and waste management of cities to minimize the per capita environmental impact of cities.

SDG 12.4: International frameworks to achieve environmental management of chemicals and all waste during their life cycle to minimize their adverse impact on human health and the environment. SDG 12.5: Minimize waste generation significantly via the prevention, reduction, recycling and reuse, SDGs 12.9: Concerned with sustainable consumption and production by encouraging the scientific and technological capacity of countries.

SDG13.3: Aims at improving human and institutional capacity on climate change mitigation, reduction and adaptation, and early warning via better education and awareness.

SDG14.1: Refers to the prevention and reduction of all kinds of marine pollution, especially that caused by marine debris and nutrient pollution.

Malaysia and Sweden Implementation of SDGs

Table 3 was constructed based on the above mentioned SDGs targets' linked to e-waste and the UN records of implementation as of 2018 for each country. It shows the experiences of Malaysia and Sweden.

Table 3: Malaysia and Sweden Implementation of SDGs linked to E-Waste

	Malaysia	**Sweden**	**UN SDGs Target**
SDG 1 (No Poverty)	The score of adoption and implementation of national disaster and risk reduction strategies (Sendai Framework) was approximately 0 % in 2018.	The score of adoption and implementation of national disaster and risk reduction strategies (Sendai Framework) was approximately 0 % in 2017.	By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

SDG 2 (Zero Hunger)	The proportion of the population suffering from hunger was 2.9 % in 2016	The proportion of the population suffering from hunger was less than 2.5 % in 2016.	By 2030, end hunger and ensure access by all people, in particular, the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round
SDG3 (Good Health & Wellbeing)	-The maternal mortality ratio decreased from **79** per 100,000 live births in **1990** to **40** per 100,000 live births in **2015**. -The mortality rate of children under five years of age fell from **10.2** per 1,000 live births in **2000** to **7.9 per 1,000 live births** in **2017**.	- The maternal mortality ratio decreased from **8** per 100,000 live births in **1990** to **4** per 100,000 live births in **2015**. -The mortality rate of children under five years of age fell from **4.1** per 1,000 live births in **2000** to **2.8 per 1,000 live births** in **2017**.	- **By 2030**, reduce the global maternal mortality ratio to less than **70**/100,000 - **By 2030**, reduce under-5 years age mortality to at least as low as **25/1,000** live births
SDG6 (Clean Water & Sanitation)	-In **2017**, **93.33** % of the population used a "safely managed" drinking water service—an improved source located on-premises, available when needed and free from contamination -In **2017**, **88.63** % of the population used a "safely managed" sanitation service—a basic facility that safely disposes of human waste	- In **2017**, **99.94** % of the population used a "safely managed" drinking water service—an improved source located on-premises, available when needed and free from contamination - In **2017**, **93.38** % of the population used a "safely managed" sanitation service—a basic facility that safely disposes of human waste	- **By 2030,** achieve universal and equitable access to safe and affordable drinking water for all - By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing the release of hazardous

			chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
SDG8 (Decent Work & Economic Growth)	-The annual growth rate of real gross domestic product (GDP) per capita declined from **6.37** % in **2000** to **4.43%** in **2017**. - Domestic material consumption was approximately **16.37** metric tons per capita in **2017**. - The total unemployment rate increased from **3.0** % in **2000** to **3.4%** in **2017**.-	- The annual growth rate of real gross domestic product (GDP) per capita declined from **4.64** % in **2000** to **1.35%** in **2017**. - Domestic material consumption was approximately **16.91** metric tons per capita in **2017**. -The total unemployment rate increased from **5.5** % in **2000** to **6.7%** in **2017**.	at least 7% GDP growth per annum in the least developed countries -Improve progressively, through 2030 -By 2030, achieve full and productive employment
SDG11 (Sustainable Cities & Communities)	-NA -In **2016**, the annual population-weighted average mean concentration of fine suspended particles of less than 2.5 microns in diameter (PM2.5) was about **16.04** micrograms per cubic meter. This is above the maximum level for safety set by the WHO of 10 micrograms per cubic meter.	- The proportion of the urban population living in slums was **0.0** % in **2016**. -In **2016**, the annual population-weighted average mean concentration of fine suspended particles of less than 2.5 microns in diameter (PM2.5) was about **5.89** micrograms per cubic meter. This is below the maximum level for safety set by the WHO of 10	-By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums - The maximum level for safety set by the WHO of **10** micrograms per cubic meter.

	-The score of adoption and implementation of national disaster and risk reduction strategies was approximately **0** % in **2018**. -	micrograms per cubic meter. -The score of adoption and implementation of national disaster and risk reduction strategies was approximately **0** % in **2017**.	- Holistic disaster risk management at all levels
SDG12 (Responsible Consumption & Production)	Domestic material consumption was approximately **16.37** metric tonnes per capita in **2017**.	Domestic material consumption was approximately **16.91** metric tonnes per capita in **2017**.	By 2030, achieve the sustainable management and efficient use of natural resources
SDG13 (Climate Action)	The score of adoption and implementation of national disaster and risk reduction strategies was approximately **0** % in **2018**.	The score of adoption and implementation of national disaster and risk reduction strategies was approximately **0** % in **2017**.	Holistic disaster risk management at all levels
SDG14 (Life below Water))	In **2018**, **1.04** % of the marine environment under national jurisdiction (up to 200 nautical miles from shore) was under protection.	In **2018**, **15.15** % of the marine environment under national jurisdiction (up to 200 nautical miles from shore) was under protection.	By **2020**, conserve at least **10%** of coastal and marine areas, consistent with national and international law and based on the best available scientific information

Source: Author compilation from https://country-profiles.unstatshub.org/swe and https://unstats.un.org/sdgs/indicators/indicators-list/

The table shows that nothing was accomplished in both Malaysia and Sweden regarding the implementation of "Sendai Framework" for Disaster Risk Reduction adopted in 2015. The percentage of population suffering from hunger in Malaysia in 2016 was 2.9% while in Sweden it was less than 2.5%. Although the target is the total elimination of hunger, these percentages in both countries are promising to accomplish the UN task in 2030.

The mortality ratio 2015 in Malaysia is 40/100,000, and in Sweden, it is 4/100,000 although UN SDG target is set for 70/100,000. Therefore, both countries have already completed this target. Also, the mortality rate of children under five years old in Malaysia is 7.9/1,000 live birth, in Sweden 2.8/1,000 live birth and UN target was set to be 2.5/1,000.

Regarding clean water and sanitation goal, Malaysia and Sweden achieved 93.33% and 99.94% respectively concerning access to clean, safe, and affordable water in 2017. This means both countries will achieve the UN target of access to clean, safe, and affordable water before 2030. Additionally, 88.63% in Malaysia and 93.38% Sweden used safely managed sanitation services.

The targeted growth in Gross Domestic Product (GDP) in the least developed countries is set to 7% annually; however, in 2017, it was 4.43% and 1.35% in Malaysia and Sweden respectively. The unemployment rate was 3.4% and 6.7% in Malaysia and Sweden respectively; UN target is full employment by 2030.

In 2017, Malaysia domestic material consumption was approximately16.37 metric tonne per capita, and Sweden was 16.91 metric tonne per capita while UN SDG target stated to achieve the sustainable and efficient consumption of natural resources.

In 2018, 1.04% of the marine environment was under protection by the national jurisdiction in Malaysia and 15.5% in Sweden; UN target is to conserve at least 10% of the marine area. Malaysia needs to concentrate more on the marine environment.

According to the above information for the three years assessment of the implementation of SDGs, Malaysia is going in the right direction of accomplishing the intended SDGs in connection to e-waste management as well.

Basel Convention

The Basel Convention (BC) for controlling of transboundary movement of hazardous wastes and their disposal was adopted in 1989 in Basel, Switzerland as a result of the discovery of toxic waste imported from abroad and dumped in Africa and some parts of the developing countries in the 1980s and it was entered into force in 1992. The main objective of BC is the protection of human health and the environment from hazardous wastes. BC categorized e-waste as hazardous waste since it contains toxic materials such as mercury and brominated flame-retardants among other precious and heavy metals that can be recovered, recycled, and used as a secondary source of raw materials. BC started to address e-waste issues in 2002 with the main objective of environmental management, prevention of illegal traffic to developing countries, and global capacity building of better e-waste management. It initiated several e-waste working plans, such as The Mobile Phone Partnership Initiative (MPPI) to achieve better supervision of the product and increase the consumer's awareness of environmental problems generated from mobile phones waste after the end of their life time and initiate reuse, recycle

and disposable alternatives. The other initiative is the Nairobi Declaration on environmentally sound management of e-waste.

Malaysia E-Waste Management Experience

Country's Profile

Malaysia is a Southeast Asian country with a population of 32.58 million as of the second quarter of 2019[97], the majority of them, (about 70%) live in cities and urban areas. A fifth of the population resides in the Kuala Lumpur area, which includes the county's capital. Its GDP and per capita income in 2018 were approximately US$354 billion USD and US$11,000, respectively[98]. Malaysia in the 1970s was only a producer of raw materials such as rubber and tin, however, now it is a leading exporter of electronic parts and its components, electrical appliances, and natural gas and palm oil, with an open economy for trade and investments. It is considered as an upper-middle-income economy (Honda, Khetriwal and Kuehr 2016).

The E-waste situation in Malaysia

United Nations University (UNU) estimated that Malaysia generates approximately 250,000 tonnes of e-waste per year or 7.7 Kgs per person. Due to the exponential growth of the adoption of mobile phones, the consumption of electronic and electrical products has increased steadily.

Malaysia Industrial and Households E-waste

According to 2008 Guidelines for the classification of used electrical and electronic equipment in Malaysia, e-waste is categorized by 2005 Environmental Quality Regulation as scheduled waste with the code SW 110, which is defined by the Department of Environmental (DOE) as:

"*Wastes from the electrical and electronic assemblies containing components such as accumulators, mercury-switches, glass from cathode-ray tubes and other activated glass or polychlorinated biphenyl-capacitors, or contaminated with cadmium, mercury, lead, nickel, chromium, copper, lithium, silver, manganese or polychlorinated byphenyls*."

The purpose of the guidelines is to assist all waste stakeholders (generators, transporters, importers, exporters and any authority related to waste management) in identifying the used electrical or electronic equipment as e-waste[99] (see the guidelines for detailed information). Malaysia is a member of Basel Convention for controlling the transboundary movements of hazardous waste and their disposals which list e-waste as code A1180 and code 2010. As a party to the convention, Malaysia needs to abide by its rules and follow the procedures for

97 https://dosm.gov.my

98 https://data.worldbank.org/country/malaysia

99 http://www.env.go.jp/en/recycle/asian_net/Annual_Workshops/2008_PDF/Handout/14_Malaysia-guideline.pdf

importing and exporting such wastes. It is mandatory to obtain prior written approval from the Department of Environment for any importing or exporting of any waste and if any person breaches this mandate he/she shall be punished with imprisonment and liable for fine *(table 4: Malaysia and Sweden Experience with Basel Convention).*

Table 4: Malaysia and Sweden Experience with Basel Convention

Country	Malaysia	Sweden
Focal Point	Ministry of Natural Resources and Environment	Ministry of the Environment and Energy
Hazardous Waste (HW) Legislations	Yes	Yes
Punishments of HW Illegal Trafficking	Fine/ Prison	Fine/ Prison/ Environmental Sanctions
	-National strategies/policies -Legislation, regulations and guidelines	-National strategies/policies -Legislation, regulations and guidelines
Available Statistics on HW (Yes/No)	No	Yes
BC Unpaid pledges (USD) for 2018 & prior yrs. As at 31.12.2018	0	0
BC Pledges for 2019 (USD)	19,433	57,697

Source: Basel Convention Countries Annual Reports

Malaysia generated about 688,000 metric tonnes of e-waste in 2008 and is forecasted to generate 1.11 million metric tonnes in 2020. There is a management system in place for industrial e-waste where there are full and partial recovery facilities operated by private companies that pay the industries or the e-waste generators for supplying them with the e-waste[100]. However, for households, there is still no complete system in place for e-waste management, and it is ended up in an informal facilities by different channels of collections, like, none governmental organizations (NGOs), charity organizations, door to door collectors or other recyclable buyer and junkshops. There are various problems created as a result of this practice and the use of the informal facilities, such as risk to human health when dismantling e-waste items without wearing protective devices and danger to the environment when the unwanted parts which contain toxic and hazardous parts are illegally dumped or illegally burned.

100 http://www.unep.or.jp/ietc/SPC/news-jul10/Malaysia_(Dr.RahmanAwang).pdf

Government's Initiatives

The minister of Natural Resources and Environment, Malaysia launched on 2013 "E-waste Alam Alliance Malaysia" to effectively collect, segregate and transport e-waste by developing a centralized system; increase the awareness of the public, producer, seller and distributor of e-waste management; encourage voluntarily collection of e-waste by manufacturers, vendors and distributors and to create a stakeholders cooperation network[101].

Sweden E-Waste Management Experience

Sweden ranked as the leader in the overall implementation of the SDGs in 2018 (Sachs 2018). As far as waste management is concerned, its collection level is one of the highest in Europe. A report by the Swedish, Environmental Protection Agency, pointed out that the strongest point in Swedish waste management's system success refers to the cooperation between municipalities, producers, recycling centers and the high awareness of the Swedish people of the importance of waste sorting (EPA 2009).

The Swedish Environmental Protection Agency (EPA) and the municipalities were assigned the responsibility of enforcement authority on producer responsibility on electrical and electronic equipment (EEE) under the Ordinance (2014:1075) and Ordinance (2008:834) for batteries (refer to Appendix I for EEE legislation in Sweden). EPA defines EEE producer as anyone who places EEE in the Swedish market. The producer responsibility is an obligation to accept the wasted EEE when they are returned and covers its management and all the accompanying financial responsibilities. The scope of producer responsibility was changed in 2018 to cover more equipment categories. Below is a list of the legislations related to EEE/WEEE (EPA 2009).

Report produced EEE

Producer of EEE and batteries must submit an annual report on 31st of March to report the quantities produced and all the components, equipment parts and consumable according to Ordinance (2014:1075) to Swedish EPA. The report has to include also the quantity of EEE/batteries that had been providing to the market the previous year, failure to report on time may lead to receiving an environmental sanction charge as per the Ordinance (2012:259). The reports must be submitted via the European Environmental Bureau (EEB) register. EPA will compile all the reports and make sure the producer's compliance with the producer responsibility provision.

101 http://www.doe.gov.my/hhew/

Report collected and treated WEEE

Each producer and distributor of EEE is responsible for the equipment' produced when they became waste and shall take any financial and organizational responsibility to take back or treat WEEE in an environmentally acceptable form. The producer responsible for household EEE is obliged to join an EPA permitted collective scheme only. These permitted collective schemes, and the municipalities are the only entities that may collect household WEEE. El-Kresten AB and Receipo Ekonomisk förening are the only permitted collective schemes in Sweden. For the WEEE other than households WEEE the rules of waste management, in general, applies, however, no need to join a collective scheme. The producers of EEE other than EEE for households shall report how much waste from other EEE has been collected and treated after receiving the information from the recycler. The same is expected for batteries collected and treated.

Annual Enforcement Fee

EPA has set an annual fee of 1,000 SEK (Swedish Krona) for each producer responsibility and 2,000 SEK for producers of both EEE and batteries to cover administration costs, managing the EEB register and any other expenses that assist in enforcing compliance.

Conclusion

As mentioned above the importance of e-waste management is not only for the minimization of its negative environmental impact; it also has valuable social and economic contribution if it is well managed. There is a great need for a collaborative work of all concerned stakeholders, from consumer to producers, government, businesses, entrepreneurs, and society to transfer the electric and electronic industry from an industry generating waste to a circular one. New business models and ideas need to be innovated and implemented; new policy framework needs to be initiated to develop a practical e-waste infrastructure.

This paper focused on the experience of Sweden and Malaysia. Malaysia is on track and working for achieving the SDG goals related to E-waste. However, Sweden success and high achievement in e-waste management has to be highlighted as a benchmark for other countries.

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Appendix I: EEE Legislations in Sweden [102]

- Ordinance (2014:1075) on producer responsibility for electrical and electronic equipment to:

  1. Promote measures to reduce the amount of electrical equipment which becomes waste,
  2. Reduce the problems for human health and the environment electronic waste,
  3. Producers shall take responsibility for the problems of electronic waste provides and to give them incentives to take waste prevention measures,
  4. Easier for holders of electronic waste to leave the waste,

[102] http://www.swedishepa.se

5. All electrical equipment which, despite waste prevention measures become waste must be collected and otherwise handled at the way that gives the best results for human health and the environment taking into account that the waste should be prepared for reuse, recycled, otherwise or disposed of in the order of priority listed now, and
6. Promote resource efficiency and to reach the targets for recycling

- Ordinance (2008:834) on producer responsibility for batteries
- The WEEE-directive of the European Parliament and the Council 2012/19/EU
- Ordinance (2011:927) on waste
- Regulation (NFS 2018:11) by the Swedish EPA on pretreatment of WEEE
- Ordinance (2000:208) on producer responsibility for filament bulbs and certain lighting equipment
- Ordinance (2012:861) on hazardous substances in electrical and electronic equipment
- European Parliament and of the Council 2011/65/EU
- Ordinance (2012:259) on environmental sanction charges
- Law (1985:206) on fines
- Ordinance (2011:13) on environmental enforcement

Ordinance (1998:940) on fees for permit matters and enforcement according to the Environmental Law

The Role of Islamic Finance in Fostering Circular Business Investments: The Case of Qatar

Abdul Jalil Ibrahim and Nasim Shirazi

Introduction

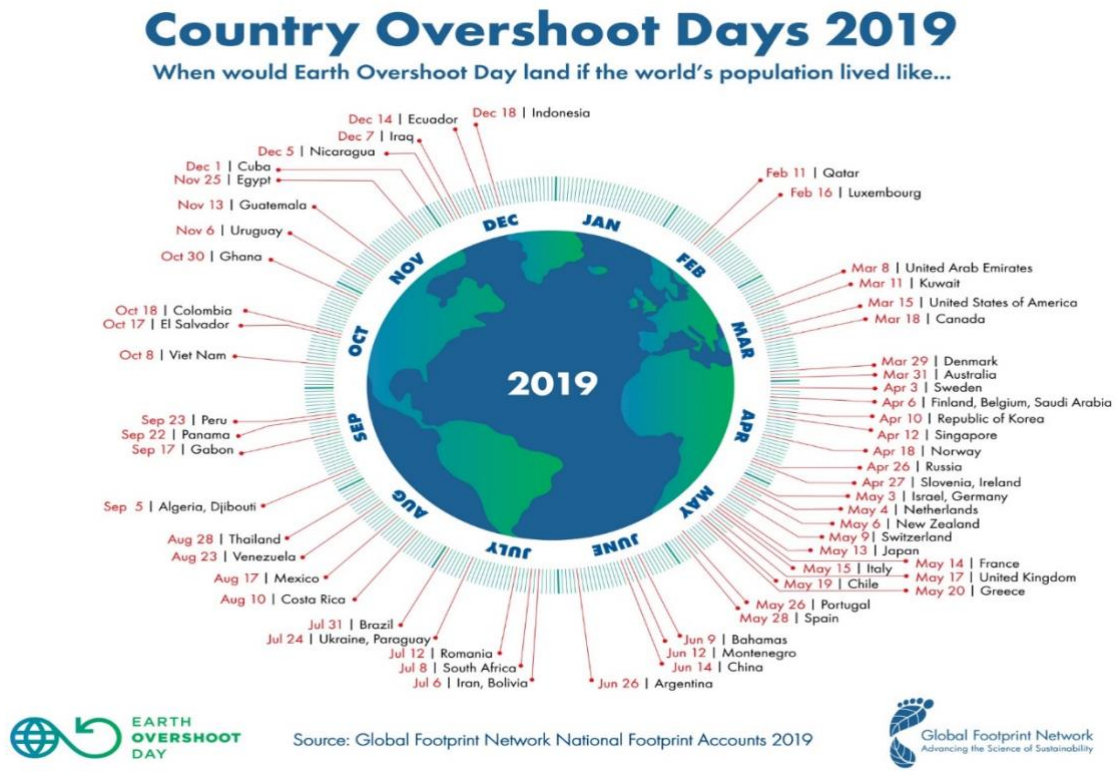
Health, food, wealth, and security as drivers of human wellbeing and foundations of the modern society are built on and nourished by natural capital estimated at US$125 trillion a year. This natural capital constitutes the services involved in many economic activities provided by nature (WWF, 2018). On the back of this vast services provided by nature, the business and finance industry is beginning to question how global environmental risks will affect the macroeconomic performance of countries, sectors and financial markets, and policymakers wonder how to meet climate and sustainable development targets with declining nature and biodiversity (WWF, 2018). The level of consumption of natural stock through human consumer behavior and wealth creation have adverse impacts on the sustainability of the planet.

The Global Footprint Network report for 2019 concludes that it will take 1.75 piles of earth for humanity to sustain and meet the current demand of human wellbeing through the "planet's ability to recover from what resources consumed within each year—like regrow the trees we cut down, absorb the carbon dioxide we emit, and replenish the seas with the fish we harvest, to name a few". The report further estimates that the planet exhausts its stock of resources the earth can regenerate in 365 days within 209 days (Global Footprint Network National Footprint Accounts, 2019). This year's figure is three days earlier compared to 2018 figure of 212 days. The regeneration deficit continues to grow occasioned by increasing human population and appetite for high consumption. Figure 1 presents the World Overshoot Days of countries which indicates how the Earth will overshoot if the world population lived like this.

The linear economy is the legacy of the Industrial Revolution, where the world witnessed unprecedented prosperity and led to the consumption of an ever-increasing variety of goods and services (Working Group Finance, 2016). Motivated by the notion that natural resources and the space needed for waste disposal were inexhaustible, a linear economic approach, emerged, the so-called 'take, make, dispose of' model where the majority of feedstock used to make products was eventually thrown away (Working Group Finance, 2016). In the present era, the costs and supply risks surrounding non-renewable natural resources are high, and the negative externalities associated with their use, such as climate change and biodiversity loss,

are felt. Working Group Finance (2016) conclude that the destruction of the value inherent in the linear economy has become clear and the potential for an alternative circular approach, one that is regenerative and restorative by design, is increasingly appealing. The report further concludes that if linear economic principles remain the norm of business practices and consumption patterns, the outcome is likely to be shortages of certain materials, growing price volatility, and continued environmental degradation. Tackling this challenge requires a new economic paradigm of 'reduce, reuse and recycle', the Circular Economy(CE) concept (ING, 2015). The concept of a CE aims to present a solution to this challenge by combining revenue with social impact. It enables businesses to grow and prosper while keeping the environment and society intact, ensuring growth for themselves as well as future generations (ING, 2015). Financial institutions can contribute to the transition towards a CE.

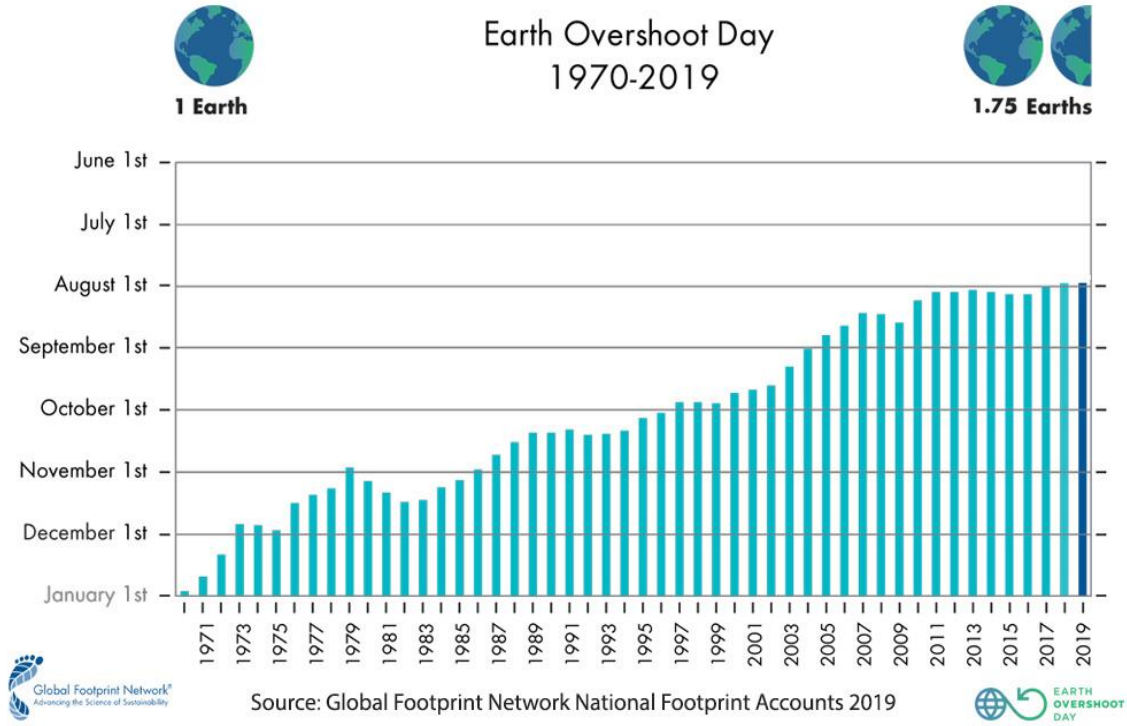
Figure 2 Country Overshoot Days in 2019



This is done through enabling companies to make the transition to a CE on a financial level; and also by looking at their business models and product offerings to align them with circular business models (Working Group Finance, 2016). Even though there is a consensus among Islamic financial institutions that sustainable finance aligns with Islamic finance principles, less than one-third of respondents in a survey indicated they had developed sustainable finance policies and with a quarter of respondents developing tools for measuring their impact on the

environment (Al-Mubarak and Goud,2018). Khan (2019a) emphasizes that to achieve compressive human development as envisaged by the Islamic finance theorists; there is a need for a paradigmatic and regulatory reform to address the objectives of Sharīʿah (maqāṣid al-Sharīʿah) to ensure that ecological environment is recognized as a resource. In this regard, there is a need to replace the current waste-driven linear economy paradigm with a new zero-waste ḥalāl CE paradigm consistent with the Islamic vision of entrepreneurship (Khan, 2019b).

Figure 3 Earth Overshoot Day 1970- 2019



This paper is seeking to explore the role of Islamic finance in fostering investments towards the CE in order to optimize resource use and avoid waste in the course of economic growth thus decouple economic growth from resource use. Whereas Khan (2019b) is proposing the use of Waqf venture as a vehicle for circular business financing, our paper is looking at it from the macro perspective with a focus on how Islamic finance can contribute to building circular business financing ecosystem, taking Qatar as a case. The case of Qatar is presented and ways to leverage Islamic finance unique value proposition and the structuring of Islamic finance contracts to attract investments and financing of the CE in Qatar.

Literature Review on CE

According to Ellen MacArthur Foundation (2008), a CE is an industrial economy that is restorative by intention and design. One of the main principles of a CE is that 'waste is food.' This means that all materials and products can be seen as temporary repositories of materials (or nutrients) that will subsequently become the inputs for new products. In a CE, the concept of waste is eliminated by carefully designing products and industrial processes in such a way that materials are nutrients in a perpetual flow in either the biological cycle or the technical cycle. The two cycles are separated for the reason that technical nutrients, such as plastics and metals, can be repurposed by human action whereas biological nutrients serve as inputs for new organic matter, such as crops and forests. The economic benefits of products and materials cycling through the system will not be coupled with the degradation of natural capital since stocks of non-renewable resources are controlled and renewable resources are used whenever possible. A CE also addresses some of the externalities mentioned earlier as it reveals and designs out waste, pollution, and toxic materials. A transition to a CE may also generate positive externalities as it will likely spur innovative technologies and business models. Consequently, a CE aims at decoupling the creation of wealth and jobs from the consumption of non-renewable resources by maximizing resource productivity and minimizing waste generation.

The concept of the CE has been gaining momentum since the late 1970s (EMF, 2013b). Several authors, like Andersen (2007), Ghisellini et al. (2016), and Su et al. (2013), attribute the introduction of the concept to Pearce and Turner (1989). By describing how natural resources influence the economy by providing inputs for production and consumption as well as serving as a sink for outputs in the form of waste. This is influenced by Boulding's (1966) study, which describes the earth as a closed and circular system with limited assimilative capacity, and inferred from this that the economy and the environment should coexist in equilibrium. Some theoretical works influence the contemporary understanding of the CE and its practical applications to economic systems. Some of the most relevant theoretical influences are cradle-to-cradle (McDonough and Braungart, 2002), laws of ecology (Commoner, 1971), looped and performance economy (Stahel, 2010), regenerative design (Lyle, 1994), industrial ecology (Graedel and Allenby, 1995) and the blue economy (Pauli, 2010).

The most renowned definition has been framed by the Ellen MacArthur Foundation, introducing the CE as "an industrial economy that is restorative or regenerative by intention and design" (2013b). Similarly, Geng and Doberstein (2008), focusing on the Chinese

implementation of the concept, describe the CE as the "realization of a closed-loop material flow in the whole economic system". Webster (2015: 16) adds that "a CE is one that is restorative by design, and which aims to keep products, components and materials at their highest utility and value, at all times".

Kirchherr et al. (2017) findings after analysis of 114 definitions of CE indicate that the CE is most frequently depicted as a combination of reducing, reuse and recycle activities, whereas it is often not highlighted that CE necessitates a systemic shift. The authors argue that the definitions show few explicit linkages of the CE concept to sustainable development. The paper findings with regards to the economic prosperity emphasis of the CE is similar to Geissdoerfer et al. (2017) that the concept aims economic prosperity, followed by environmental quality; its impact on social equity and future generations is barely mentioned.

The embrace of CE from both policy and business development perspectives is motivated by the view that it is seen as a way to achieving sustainable environmental and economic development (Ellen MacArthur Foundation, 2015, 2012 and European Commission, 2015). There is a great concern with the incumbent traditional linear extract-produce-use-dump material and energy flow model of the modern economic system which is seen as upfront to social, economic and environmental sustainability (Frosch and Gallopoulos, 1989). Consequently, CE is promoted as a model that will spur the economic system with an alternative flow model, one that is cyclical and regenerative (Ellen MacArthur Foundation, 2015, 2012, 2013 and Geissdoerfer et al., 2017).

The concept of CE has been around for many decades but has been popularized in recent years owing to the advocacy by some non-governmental organizations such as the Ellen MacArthur Foundation which has conducted extensive studies into the topic (Geissdoerfer et al., 2017). According to the 73rd UN General assembly "the CE holds particular promise for achieving multiple SDGs, including SDGs 8 on economic growth, 6 on energy, 11 on sustainable cities, 12 on sustainable consumption and production, 13 on climate change, 14 on oceans, and 15 on life on land"[103]. The CE transition will require a concerted effort from multiple stakeholders including industry and community, but policymakers have a critical role to play in designing appropriate incentives and access to financing that promote reuse of material and higher resource efficiency (Ellen MacArthur Foundation, 2019).

[103] CE for the SDGs: From Concept to Practice G e n e r a l A s s e m b l y a n d E C O S O C J o i n t M e e t i n g Draft Concept and Programme for the joint meeting of the Economic and Financial (Second Committee) of the 73 UN General Assembly and the UN Economic and Social Council

Recognizing the enormous benefit of the CE, many countries formulating policies and strategies geared towards transiting from the linear economy to the CE across the world. The European Union has been in the forefront of the CE transition with The Lisbon Treaty outlining the guiding principles of EU environmental protection policy and its objectives which includes a principle to ensure the "prudent and rational utilization of resources." This provides the legal basis for the action of the EU in the area of sustainable resource use and the CE (Domenech and Bahn-Walkowiak, 2019). The EU also issued the implementation plan of the CE through the CE package in 2015 to support the transition of European states towards a more sustainable economy (European Commission, 2015b). The CE package was adopted in July 2014 which was entitled "Towards a CE: a zero-waste program for Europe" which established a common and coherent EU framework to promote the CE targeting recycling, job creation, new business models eco-design and industrial symbiosis, and reducing greenhouse emissions.

This policy was withdrawn and replaced by a new one titled "Closing the Loop – An EU Action Plan for the CE" which seemed to put a stronger focus on eco-innovation to cover the whole process from design to disposal and recovery/recycling. The new package adopted measures that will support the eco-design directive to achieving reparability, durability, and recyclability in product requirements. The policy also includes provision for tackling obsolescence equipment, decommissioning requirements electronic products reusing and recycling, etc. The legislative proposal set targets of 65% recycling target for municipal waste by 2030, 75% of recycling of package waste by 2030 and limiting landfill use for waste to 10%

The House of Commons report in the UK recommended the adoption of the CE through government incentives and catalyst to signal consumers and producers. Some of the interventions suggested included taxation reforms, regulating producers' responsibility by rewarding reuse, and making funds available to organizations that promote recovery of materials. Other proposed interventions include using government procurement power to compel organizations not to supply non-recyclable materials when recyclable one is available. (HOUSE, O. C., 2014). It is essential to mention that the government rejected some of the recommendations and only implemented the recyclability and the producer responsibility schemes in emerging sectors of the economy (Sanderson, 2014)

In Asia, China is providing a leading role in CE transition by enacting a CE Promotion Law of the People's Republic of China. The essence of the law is to provide a legal and policy framework for promoting CE, improving resource efficiency, and protecting and improving the environment in a sustainable way (Lacy and Rutqvist, 2015). The CE policy approach in China is to go beyond environmental management and recycling to holistically deal with the

new development paradigm of closing the loops of material flow within the entire value chain of extraction and production. Zhu (2014) outlines some of the activities undertaken by stakeholders in China towards CE adoption including working with some strategic enterprises at the micro-level, the establishment of circular industrial parks at the meso level and the selection of some cities and regions to champion the pioneering work of CE transition at the national level. In summary, China's current development effort is trying to synch with the CE, including massive investments in the shift to renewable energy, the rapid development of digital technologies, and a boom in asset-sharing platforms (EllenMarcArthur Foundation, 2018). Despite this effort, many challenges exist that may undermine the full transition towards the CE and among these are microeconomic factors, market failures, regulatory barriers, and societal customs.

Japan is another country that has pursued policies geared towards the adoption of CE and this is mostly driven by the resource-scarcity in the country as it seeks to optimize the resource use in order to be competitive (Lacy and Ruqvist, 2014). The country passed the law on the promotion of efficient use of resources in 2000(Ministry of the environment, 2000) followed by the Fundamental Plan for Establishing a Sound Material-Cycle Society (2013). The framework provides for the clarification and blueprint (including roles and responsibilities) for reforming the society's lifestyles based on mass production, consumption, and disposal. The Law, on the other hand, establishes a general scheme with a focus on waste management and effective utilization of resources which include extended producer responsibility as well as legislation focused on specific products by looking at containers and packaging, home appliances, food, construction materials, and vehicles. (Cairns et al., 2018). The country developed an indicator for measuring progress towards a CE by the rate of recycled goods, disposal and material productivity with policies geared towards raising productivity and recycling and minimizing disposal in the long run (Tanaka, 2014)

In the GCC, there is no comprehensive policy on CE despite the enormous potential within the countries in the region. According to a report by the World Government Summit, GCC countries can save almost $138 billion by 2030 if they adopt a circular economic model. This corresponds to almost 1 percent of the region's cumulative GDP between 2020 and 2030.[104] Despite the lack of CE policies, GCC countries have in one way or the other have started to explore sustainable solutions in their development policies as some of them have captured

[104] https://www.worldgovernmentsummit.org/docs/default-source/default-document-library/putting-gcc-cities_v4.pdf?sfvrsn=79f7614d_0

targets of renewable energy, addressing suitable consumption and reduction and waste management in their national visions and strategic targets(World Government Summit, 2019). For instance, Qatar National Vision 2030 outlines how the country can achieve sustainable economic and environmental development (QNV2030, 2008). UAE Vision 2021 includes ambitious targets on waste treatment, renewable energy development, and water recycling, and all these are all policies that will ultimately lead to transition towards a CE. Saudi Arabia Vision 2030 also captures safeguarding the environment by increasing the efficiency of waste management, establishing comprehensive recycling projects, and pollution reduction of all forms (Al Soudan, 2019).

The Role Of Islamic Finance In The Transition Towards CE, Sustainability and Financial Stability

The Network for Greening Financial Services(NGFS) recognizes that there is a substantial risk that climate-related financial risks are not fully reflected in asset valuations. There is a need for collective leadership and globally coordinated action and, therefore, the role of international organizations and platforms is critical. The report came out with six recommendations in order to achieve the goal of greening the financial system. Four of the recommendations relate to actions to be undertaken by central banks and supervisors and by extension, financial institutions. The other two relate to governments and policymakers, which are also seen as a springboard which central banks and regulators can leverage on to take actions within their mandate.

The first recommendation relates to integrating climate-related risks into financial stability monitoring and micro-supervision and assessing climate-related financial risks in the financial system. This is achieved by mapping physical and transition risk transmission channels within the financial system and adopting key risk indicators to monitor these risks conducting a quantitative climate-related risk analysis to size the risks across the financial system. The second recommendation relates to integrating sustainability factors into own-portfolio management. Going forward, the NGFS considers exploring the interaction between climate change and central banks' mandates (beyond financial stability) and the effects of climate-related risks on the monetary policy frameworks. The third recommendation calls for bridging the data gaps by sharing appropriate data on Climate Risk Assessment (CRA) among public authorities. In that respect, the NGFS sees merit in setting up a joint working group with interested parties to bridge the existing data gaps. The fourth and final recommendation for

central banks and supervisors action relates to creating awareness and intellectual capacity and encouraging technical assistance and knowledge sharing. It is recommended that efforts are being made by the government and policymakers to achieve robust and internationally consistent climate and environment-related disclosure. The NGFS encourages all companies issuing public debt or equity as well as financial sector institutions to disclose in line with the TCFD recommendations. Supporting the development of a taxonomy of economic activities is another recommendation for policymakers and governments. In this regard, the NGFS encourages policymakers to bring together the relevant stakeholders and experts to develop a taxonomy that enhances the transparency around which economic activities (i) contribute to the transition to a green and low-carbon economy and (ii) are more exposed to climate and environment-related risks (both physical and transition).

The discussion above indicates that climate change is becoming a limiting factor to financial stability and regulatory authorities, and policymakers must act. This calls Islamic financial institutions to consider the impact of climate change in their operations as the long term sustainability maybe threatened and the need for Islamic financial architecture and infrastructure to begin to consider climate change as a global agenda in order to be part of the policy debate at the global stage. This will help avoid reactive policies within the Islamic finance community when stakeholders in the industry are faced with the reality in the future.

Islamic Finance and CE

Maqāṣid al-Sharī‘ah provides an vital objective that Islamic law seeks to protect, including life, faith, intellect, family, and wealth. According to Chaprah (2008), the Maqasid framework is aligned SDGs, and thus, Islamic finance can contribute to achieving the SDGs. In contributing towards SDGs, there is a growing realization that Islamic financial institutions should be concerned with their financing and investment decisions and their outcomes on the planet. Protection of the planet and the environment, climate management and adaptation, as organizational goals are clearly in conformity with Maqasid al-Shariah as well as with the SDGs (Obaidullah, 2018).

According to Islamic teachings, wasting of resources is discouraged, and there are canonical texts in the Quran that emphasizes this:

However, waste not by excess: for Allah loveth not the wasters. (Qur’ān 6:141)

Eat and drink, but waste not by excess; Verily He loves not the excessive (Qur’an:7:31)

The canonical texts presented above highlight the importance the Lawgiver attaches to conservation and avoiding wastefulness. The same principle is underlined when a believer is required to be frugal in the use of water for ablution, an act of worship, even if s/he has a river at their disposal. Water and other natural resources are thus to be seen as divine provisions.

Also, Islamic teachings emphasize the need to uphold the ecological balance put in place by Allah, and this is evidenced in the Quran 55: 7-8:

And the heaven He raised and imposed the balance

That you do not transgress within the balance.

There are numerous Quranic references to the balance in the creation of the universe and its living species, life-sustaining water, air, and energy and the calamities and disasters that occur due to irresponsible human behavior (Khan, 2019b). Nature values resources continued use and interdependence, which ensures that circularity is achieved such as water cycle, oxygen and carbon cycle, food cycle, and photosynthesis (Al-Mubarak and Blake,2018).

According to Sharī‘ah, human beings, as vicegerents of God, have the mission of faithfully observing the values given by their Creator. During their short life in this world, they may utilize the scarce resources of the planet as trustees. They must interact with each other following rules. This would not only ensure the well-being of all humans but also protect the environment, including animals, birds, and insects (Chaprah, 2008). This Islamic notion reinforces the scientific concept of a ‘chain of life,’ and interdependence among species, maintaining the balance of life on earth. This shows that human activities on the planet should be conscious of maintaining the natural eco-system put in place by the Creator.

There are not an animal (that lives) on the earth, nor a being that flies on its wings, but (forms part of) communities like you. (Qur’ān 6:38).

Islam thus values maintaining environmental balance and circularity of resources as recognized in the various verses from the Quran. Financing of economic activities that harms the environment needs to curtailed or assessed with higher risks within the spirit of Maqasid. Conversely, businesses and projects that promote circular economic growth should be encouraged and allocated more financing by Islamic financial institutions in order the achieve sustainable growth.

Islamic financial services providers, using debt-creating contracts have witnessed excessive growth, mostly addressing the needs of high-net-worth individuals and corporates. Most of these institutions are perceived to be similar to their conventional counterparts displaying a preference for short-term profit maximization over longer-term goals. Islamic economists are particularly concerned that Islamic finance has to contribute a lot more towards addressing

development-related issues, and societal concerns (Obaidullah, 2018). This shows that the Islamic financial sector can magnify some of the risks associated with climate change. This has implications for Islamic financial institutions asset allocations. For instance, when an Islamic bank invests more Murabahah, such as financing multiple cars for a client instead of supporting the circular business of sharing such as Uber or public transport, the implication is that more cars on the street will lead to higher pollution and this affects climate change. When climate change-induced disasters such as flooding occur, then it may affect their assets directly or indirectly. So the risks associated with Murabahah car financing should also consider the implication of the financing on carbon footprint. These risks have to be measured in a way and priced for climate risks adjusted returns to be assessed. The financial service sector has a huge role to play in supporting the transition towards CE, and Islamic banks may have a more significant role to play with their imbedded social impactful nature. Thus there is a need for Islamic bank practitioners and policymakers to assess its role towards CE and put measures at micro, meso, and macro, levels to address this. For instance, Islamic banks and non-bank institutions should integrate climate risks into financial risk management. With this, the borrower and deal-level financial analysis should be encouraged to include climate related impact analysis and prices. If emerging risks are identified and quantified, they need to be reflected in the risk ratings of the borrowers.

Islamic banks may also include climate considerations into limits and sector exclusion policy. These limits can be a form of restrictions on specific sectors such as coal mining in order to achieve a better climate outcome. These climate-related risks make it imperative for Islamic financial institutions to disclose to stakeholders the potential risks and measures to mitigate them. This will help to generate new sources of information for market actors and policymakers and influence the allocation of capital to facilitate the transition to a more sustainable and low-carbon economy. Circular economic models can be viewed from both product level or growth stage perspectives. From the product perspective, circular supplies, resource recovery, product life extension, sharing platforms and product as a service are presented (see table 1.)

Table 3 Circular business models viewed from the product dimension

Model	Explanation
Circular supplies	This business model is based on supplying fully renewable, recyclable, or biodegradable resource inputs that underpin circular production and consumption systems. Through it, companies replace linear resource approaches and phase out the use of

	scarce resources while cutting waste and removing inefficiencies.
Resource recovery	This business model recovers embedded value at the end of a product life cycle to feed into another one. This business model promotes return flows and transforms waste into value through innovative recycling and upcycling services.
Product life extension	This business model allows companies to extend the he lifecycle of products and assets. Values that would usually be lost at the end of the life cycle are maintained or improved by repairing, upgrading, remanufacturing, or the remarketing of products. Moreover, additional revenue is generated as a result of extended usage.
Sharing platforms	This business model promotes a platform for collaboration among product users, either individuals or organizations. These facilitate the sharing of overcapacity or underutilization, increasing productivity and user value
Product as a service	This business model provides an alternative to the traditional model of "buy and own." Products are used by one or many customers through a lease or pay-for-use arrangement. With a 'product as a service' business model product longevity, reusability and sharing are no longer seen as cannibalization risks, but instead, drivers of revenues and costs reduction.

Source: ING, 2015

There are many ways banks, including Islamic banks, can support the transition to a CE. According to ING(2015), getting familiar with CE business models is essential starting point for banks. This will allow them to assess how CE can contribute to the sustainability of their businesses as well as supporting their clients for innovative value-creation that ensure maximizing resource use. This will require that the right incentives are put in place to attract banks to channel credit towards the CE. Financial institutions will have to incorporate 'circular value' of resources in the financial business case, emphasizing cashflow of these models as well. Lastly, there a need for incorporating the characteristics of circularity in risk and pricing

models by financial institutions. This development will require more working capital financing and more attention to creditworthiness as well.

Table 2 presents the growth stage dimension of circular business models. The main aim of circular businesses is to keep control over resources and at the same time preserve value added (Finance Working Group, 2016.). This is expressed in three business model categories, each of which focuses on a different growth phase: designing and sourcing products (CIM), the use phase (CUM), and treating products after use (COM).

Table 4 The growth dimension of circular business models

Model	Explanation
Circular Innovation Model	These business models focus on the development phase of a business. Products are designed to last longer and be easy to maintain, repair, upgrade, refurbish, remanufacture, or recycle. Also, innovative processes are developed within the context of this model to increase the reuse of potential and recyclability of industrial and other products, by-products, and waste streams.
Circular Use Model	These business models focus on the use phase by optimally using the product and maintaining added value. These business models make it possible to retain ownership of the product (e.g., by servicing a product rather than selling it) and/or take responsibility for the product throughout its useful life (e.g., through maintenance services, or add-ons to extend the life of a product). Product-to-service models entail a (partial or total) conversion from manufacturing (and selling) a product to offering the product in the form of a service contract.
Circular Output Models	These business models focus on the output and added value of a product's after-use phase. In these business models revenue is generated by transforming after-use products into new products or use resources in order to add value, reduce costs, or reduce waste. The development of reverse logistics is essential for this model.

Source: Finance Working Group, 2016

The circular use model presents some financial issues which need to be addressed. The change from selling assets to providing them as a service has consequences for a company's balance sheet, working capital, and cashflows (Finance Working Group, 2016). Combined with the uncertainties concerning the residual value of the assets, uncertain consumer demand, and the absence of legal structures, the risks of the product as a service model are currently high. This means that financial institutions are unable to price these risks adequately, which can result in high-interest rates or a refusal to grant a loan at all in the case of conventional banks. The challenges facing circular businesses is not as peculiar as any innovation geared towards solving society's problem always comes with skepticism and its attendant risks (Finance Working Group, 2016). These challenges make banks see circular businesses financing as high risk and thus will be unwilling to finance.

Banks play an essential role in economic growth through the credit creation process, which leads to expansion of the money supply in an economy (Bernardo and Campiglio, 2014 and Schularick and Taylor, 2012). Thus Islamic banks can use credit allocation as a catalyst for adopting circular businesses within the achievement of Maqasid. This is done by channeling more credit and investments to circular businesses.The Maqasid objective provides a religious motivation for Islamic banks different from conventional banks. This is because despite the impact of green investment, these investments have not attracted enough credit from financial institutions (Campiglio, 2015). This is unsurprising, as investors and private banks profit incentives influence financial decisions. Spencer and Stevenson (2013) assert that green investments (which includes circular businesses) come with additional risks, and this serves as a disincentive for resource allocation in their favor. Also, in the long term, illiquid features of green investment are at odds with the appetite for short-term and liquid investments at the global markets (Spencer and Stevenson, 2013).

Islamic banks face similar problems, but they can finance circular businesses through Musharakah (active partnership) and Mudarabah (silent partnership). This financing mode put Islamic banks in a position where they partner with entrepreneurs to deploy capital towards circular businesses. Islamic banks who are committed to stimulating circular businesses transition need to redefine risks. According to Finance Working Group(2016), a risk assessment should look at both the particular risks associated with circular business models and that posed by the existing linear model. Circular business risk is manifested in the newness of the CE concept. Since circular business models are sustainable by design (i.e., excluding any linear risks), investing in circular businesses should be viewed as an opportunity to lower the risk.

Green Sukuk

According to Malaysia's Security Commission, green Sukuk are Shariah-compliant investment vehicles that fund environmentally friendly projects such as solar parks, biogas plants, and wind farms. The main objective behind the development of green Sukuk is to address Shariah concerns for protecting the environment. For Shariah-compliant investors, notably in South East Asia and the Gulf Cooperation Council regions, green Sukuk represents an ideal investment that benefits the environment and promotes CSR(Alam et al. 2016). Malaysia issued green Sukuk guidelines which cover a broad range of eligible projects which include projects that aim to: (a) preserve and protect the environment and natural resources; (b) conserve the use of energy; (c) promote the use of renewable energy; (d) reduce greenhouse gas emission; or (e) improve the quality of life for the society(Malaysia's Security Commission, 2017). Existing projects under several categories are deemed to be eligible to be categorized as an SRI project. This includes community and economic development projects relating to (i) public hospital/medical services; (ii) public educational services; (iii) community services; (iv) urban revitalization; (v) sustainable building projects; or (vi) affordable housing. Islamic trust and endowment (waqf) assets or any projects that undertake the development of waqf assets are also deemed eligible to be categorized under SRI. These principles are in line with the IFC green bond initiatives which addressed areas including resource efficiency, greenhouse gases, water consumption, and wastes.

Contemporary Islamic finance, in general, can use or adapt the general frameworks of the Climate Bond Initiative(CBI), the Green Bond(GB) Principles, and the Equator Principles as mechanisms to support projects seeking to fulfill Islam's environmental ethics and laws(Moghul & Safar-Aly, 2014). The CBI framework provides for a means of verification, audit, certification, and redress of stakeholder grievances. The GB Principles establish a broad and flexible set of guidelines for institutions seeking to support "green" projects. The Equator Principles urge participating financial institutions and projects toward a common goal requiring diligence, reporting, and independent review and assessment. Analysis of the scope of various green bonds and green Sukuk reveals that they are in synch with Maqasid al-Shariah, especially with a social and human emphasis.

The green Sukuk holds a vital promise that can be leveraged on to achieve the QNV2030 vision. Three of the four pillars of the QNV2030 relate directly with the objectives of green Sukuk, including environmental, human, and social development. Green Sukuk can be used to support Qatar's transition towards a CE by closing the loops towards renewable energy, and this can

be achieved through renewable energy investments using the green Sukuk to mobilize the investments. Green Sukuk can also be used to raise funds for investment in the waste management sector in Qatar. Achieving this will require a deliberate government policy such as a comprehensive regulatory framework for green Sukuk with incentives to attract investments into this area.

Islamic Blended Finance

Islamic blended finance involves blending Islamic institutions of compassion with the motive of earning Halal profits by undertaking responsible business that serves the society. This provides an opportunity to utilize Islamic social finance to promote responsible businesses or projects that are inclusive of human development, service to society, and preservation of the ecological environment and other species(Khan, 2019b).

Khan (2019b) propose an Islamic blended finance structure to solve the waste problem facing many Muslim societies and accelerate the transition towards a CE by using a Waqf structured venture. In this regard, the study asserts that there is need for a) changing the businesses paradigm from linear to circular; b) an incorporated institutional framework for the Venture Waqf; c) purpose of the Waqf to make impactful small businesses successful; d) design a financial contract to loan in favor of responsible businesses that convert to equity stake for the Waqf in case of default (equity-at-default) replacing collateral and foreclosure requirements. The study tackles the consciousness of businesses regarding corporate social responsibility and the design of contracts. The paper argues that there are many contracts in Islamic economics which are initially compassionate such as Kafala (sponsorship), Wakala (delegated authority), Dhaman (guarantee), Takaful (mutual protection), Tawaruq (compassionate lending by mutual sale and purchase), Hawala al Dayin (transfer of debt), Qard (compassionate interest-free loan for Forbearance), Wa'd (promise). However, given practical urgencies, these have been commercialized. It means that a compassionate institution like Wqaf has a potentially important role in harnessing the social power of these listed institutions of compassion into effective utilization. Waqf can be used purposefully for an impactful small and micro business through a *Venture* Waqf, which is proposed as an institution for the specific purpose of making the Sharia-compliant impactful small and micro businesses successful. The existing Waqf institutions collect their financial resources as Waqf contributions. The paper further argues that the Waqf institution established to make impactful businesses successful could blend its resources in a way that can help achieve a more significant impact. The sources of funds and other resources of the Venture Waqf could be interest-free loans; charitable grants; Waqf

contributions; investments; structured and blended financing with philanthropic organizations; voluntary service and advise; compassionate guarantees; any other legitimate contributions

The blending of compassion and profit motive has an unlimited scope, especially if the third element of the blending, namely the facilitating role of the government or regulator also exists. For example, if the purpose is green energy, charitable motivation can be blended with green Sukuk. Equity at Default(EaD) is a new financing structure proposed by Khan (2019b). EaD is an interest-free loan (or any other Islamic debt creating a contract) that converts to declining equity at the trigger of a default event and hence replaces collateral requirements and foreclosure conditions. The EaD is a potentially suitable contract for the venture Waqf because the motivation of the waqf is the success of the high impact, socially responsible enterprise. The general trend of rising compassion can be extended to commercial banks. Current accounts are a source of significant funds in commercial banks. For example, about 85% of the total funds of some banks in Saudi Arabia come from current accounts. In the spirit of the rising global trend of compassion, and with proper regulatory oversight, part of these funds can be utilized, by banks in a venture Waqf type of activities for extending interest-free loans to needy small enterprises based on the EaD. The venture Waqf offers a blended finance modality in which fund providers and other contributors have different motivations. Some charitable funds can be used to subsidize the cost of funds in a Murabahah transaction for impactful businesses which are cash trapped to benefit from the interest-free loan. This allows blended Islamic finance to be used as a catalyst for achieving greater impact by combining compassionate contracts with profitable ones in a win-win situation.

Aligning Islamic Finance Practice To Support Circular Economic Growth In Qatar

Circular economic growth is even more important in the case of Qatar, looking at the unique challenges faced by the country when it comes to the environment. Brook et al. (2006) reports that Qatar is characterized by high temperature, low rainfall, strong winds, and low nutrient availability of the soil. This means that recovery of the terrestrial ecosystems from disturbance is very slow. The country is seen as one of the most hostile and fragile environments on earth(Richer,2009). The environmental fragility has been worsened by the rapid industrialization and high population growth that has occurred in Qatar in the past few decades. (Luomi, 2012). As the vast energy producer in the world, Qatar carbon footprint has been high, which is reported at 13.09 global hectares per person(ghp) in 2016 compared to world 1.6 ghp.

Figure 3 shows that while the average carbon footprint in the world is 1.6 ghp, most developed countries carbon footprint is higher with Germany, United Kingdom, and Sweden estimated at 2.79, 3.19 and 3.28 respectively. Although Saudi Arabia also produces much energy, its carbon footprint stood at 5.11, owing to its relatively high population. In terms of overall ecological footprint which captures carbon footprint, fishing ground, cropland, forestry, grazing land and built-up, Qatar is ranked highest of close to 15 ghp which is more than twice the score of 6.23 ghp of Saudi Arabia and far higher the world average of 2.75 ghp. Qatar has taken steps to tackle the high carbon emissions by reducing flaring by registering Qatar Petroleum for the first United Nations Clean Development Mechanism (CDM) project under the Kyoto protocol in the Gulf region (CDM, 2007). Also, water availability has been one of the important issues of increasing industrialization, and the concomitant population increase is limiting the availability of water. Qatar is well below the World Bank "water poverty line" of 1000 cubic meters per person per year, with only an average of 91 cubic meters available per person per year (El-Sayed Selim, 2004).The annual per capita water from rainfall and groundwater is 71m3 while the average demand for life sustenance is around 1000m3 per annum (Darwish, & Mohtar,2013). The situation in Qatar is critical as the rainfall water source is below the average in the Arab region of 850M3 and 7000M3 of the world (Sadik, 2013). Almost 75% of Qatar's municipal water supply is being produced by desalination, which comes with high energy consumption, and this creates a huge environmental burden (Mannan et al., 2019).

In 2012, Qatar was ranked as the country with the world's highest ecological footprint (WWF, 2018). The biannual report investigates biodiversity and ecosystems, as well as the demands on natural resources, and what this means for humans and wildlife. According to it, if all people on the planet had the per capita ecological footprint of the average resident of Qatar, 4.8 planets would be needed to sustain the total population, and marine biodiversity is threatened by population and urban growth, construction activities, industrialization, international shipping, overfishing, overgrazing, and climate change. According to the Global Footprint Network report for 2019, ecological reserve in Qatar vanished after 1981 as ecological footprint increase as a result of increased resource consumption. This trend has been followed by a decreasing bio-capacity over the years, leading to a yawning ecological deficit over the years (see figure 4). This means that if the trend continues, Qatar will increasingly depend on other nations to meet its economic needs as domestic resources cannot support the country and this raises a huge sustainability concerns and the need to maximize resource use by adopting measures including circular businesses towards a zero-waste economy.

This calls for an urgent need to balance its natural resource use with the local environment and ecosystem limits to ensure prosperity for its people and the environment far into the future.

The National Development Strategy(NDS) outlines the environmental challenges facing Qatar and the strategies for addressing these challenges. The NDS defines waste management as a critical challenge: 7,000 tonnes of solid waste are created daily in Qatar (4.1 kg/per capita), of which 30% is a domestic waste, and only 8% is recycled.

While all sources of water (desalinated, recycled, and groundwater) suffer from inefficiencies, desalination is regarded as the most challenging: by 2020, demand is expected to rise by 5-7% per year, driven by population growth, distribution losses, and higher household use.

The NDS recognizes that, despite Qatar's robust domestic energy security situation, the opportunity cost of domestic power production is high. It also notes that certainty of supply and lower greenhouse gas emissions are additional gains from increased energy efficiency. The strategy stresses that the current wasteful consumption patterns of energy and water need to be "better managed" for the sake of intergenerational justice.

Figure 4 Ecological footprint of some countries

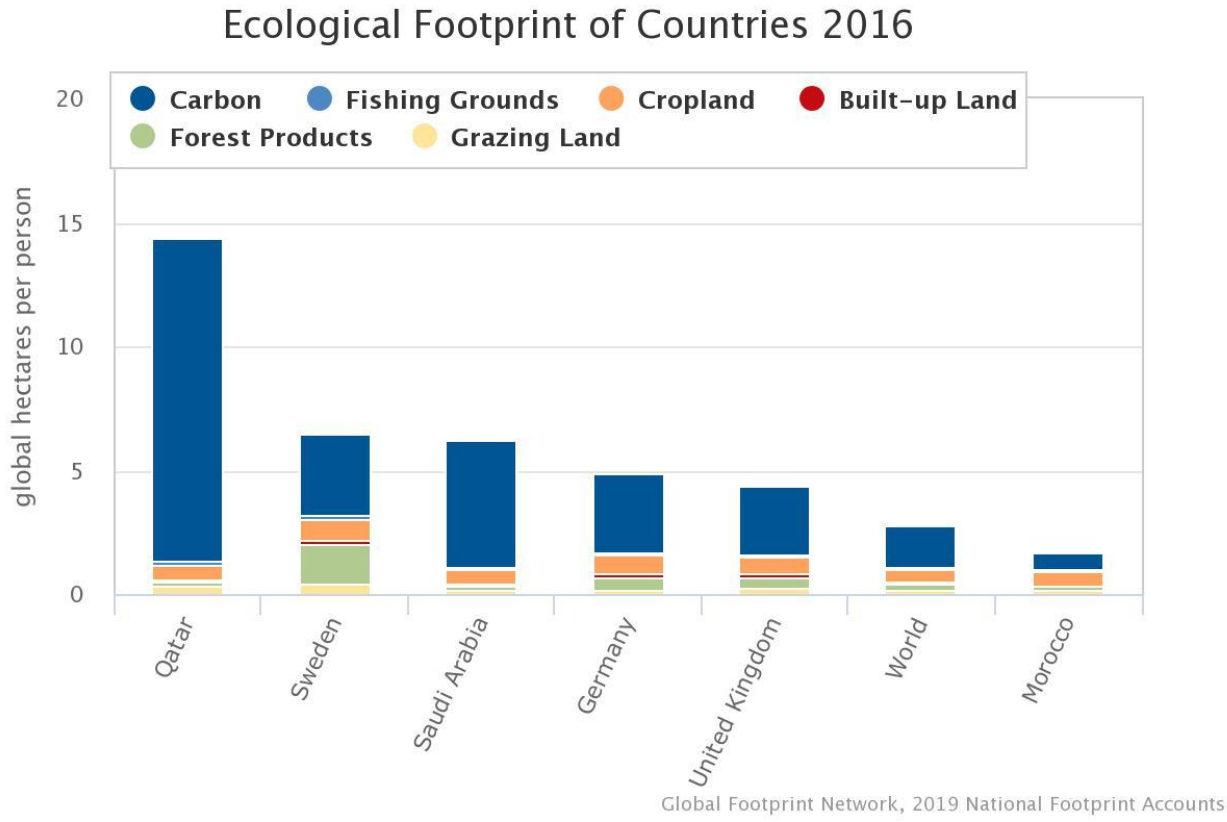
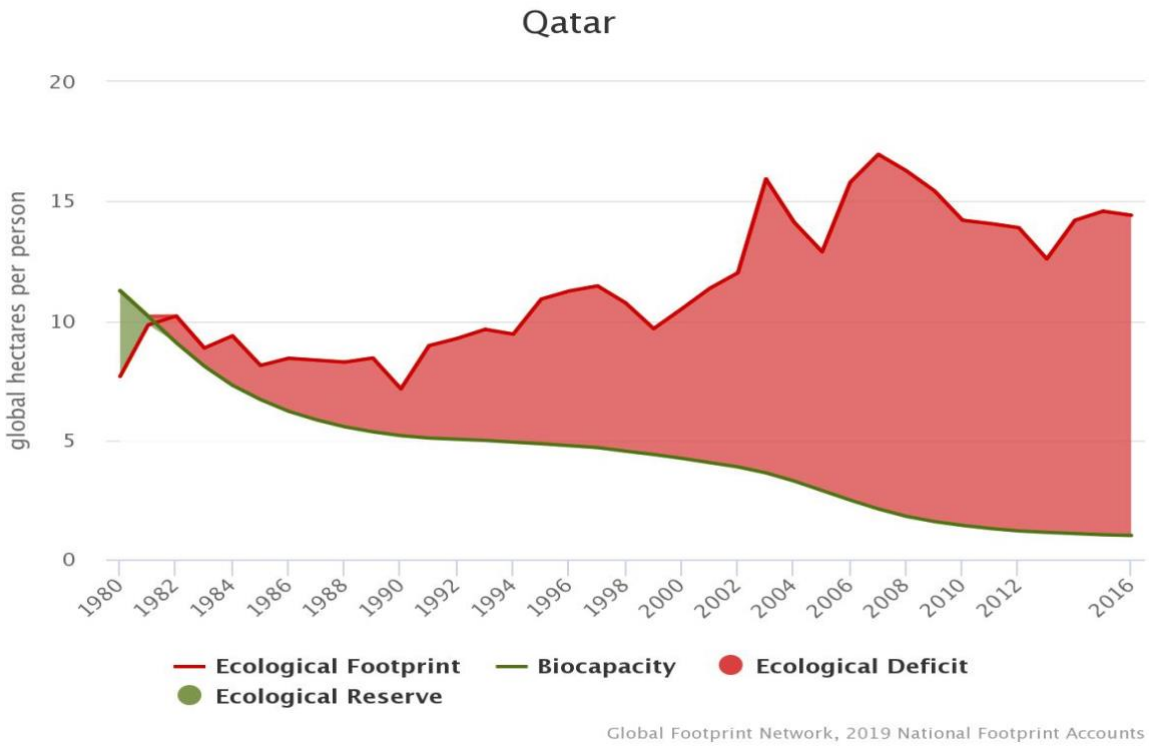


Figure 5 Ecological footprint and biocapacity



Circular businesses need attention by policy makers within the scope of impacting positively on the Qatari economy by ensuring that economic growth can be decoupled from resource use. The impactful business is geared at achieving the dual purpose of economic diversification in Qatar through circular business and promoting human wellbeing through sustainable economic growth by leveraging Islamic blended finance to attract both public and private investments in the circular business sector.

The term "impact investing" was coined in 2007 and is defined by the Global Impact Investing Network (GIIN) as: "investments made into companies, organizations, and funds to generate measurable social and environmental impact alongside a financial return."[105] Apart from GIIN, various other global organizations have come out with principles and criteria for measuring the impact of businesses around the world, including UN Global Compact, SDGs, ESG, 3Ps, and so on. Some scholars proposed Maqasid al-Sharia as a criterion for measuring business impact. In this regard, Islamic Value Accounting by Mohammed Obaidullah in 2005 is worth mentioning. In more recent research, Obaidullah (2018) asserts that the fact that many Sustainable Development Goals (SDGs) align with Maqāṣid al-Sharī'ah (MaS) means that The MaS-driven Islamic finance would ultimately work towards achieving the SDGs. Hence Islamic finance should naturally be concerned with its impact on society.

[105] "About Impact investing," GIIN, accessed on February 10, 2019 https://thegiin.org/impact-investing/

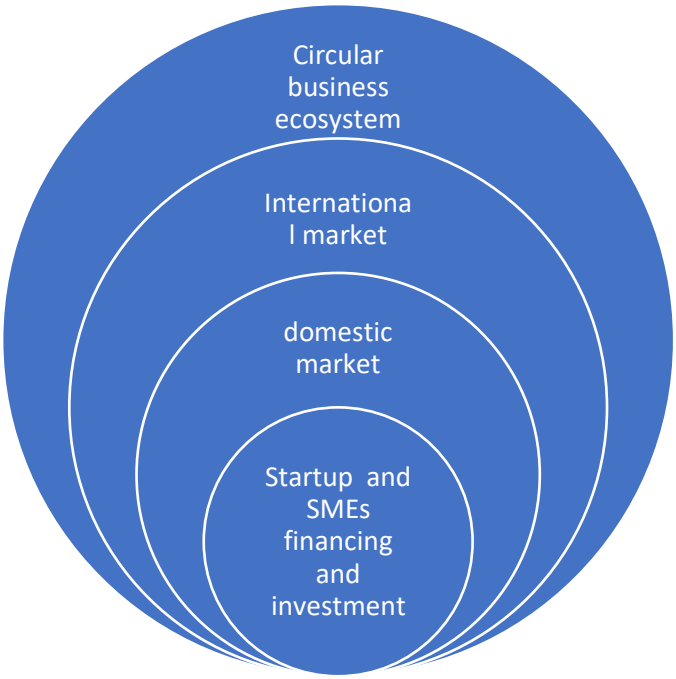
A careful analysis of the Qatar National Vision 2030 reveals that the tenets of impact investing are captured in the document. The preamble of the QNV2030 is couched "The National Vision aims at transforming Qatar into an advanced country by 2030, capable of sustaining its development and providing for a high standard of living for all of its people for generations to come" and has four core pillars of human development, social development, economic development, and environmental development.

Circular businesses present an opportunity for Qatar to grow its economy my maximizing resource use and decoupling economic growth from resource use. It is estimated that circular economic growth can benefit Europe by €1.8 trillion by 2030, twice the benefit of the current development path, and CO2 emission reduction by 48% by 20130(Shulze, 2016). This shows the vast potential that underlies circular economic growth pursuit.

Diversifying Qatar's economy requires exploring markets beyond Qatar in order to benefit from economies of scale as Qatar's market is relatively small. To achieve this will require promoting start-ups and SMEs in Qatar with a global mindset. Various circular businesses within the various models can be developed as business propositions. It is essential to recognize that attracting entrepreneurs into this sector will go beyond Qatar if three is the right ecosystem is available and originated from Qatar. This will require a massive amount of financing at the initial stages to develop the market. In this regard, there needs to be a strategy to finance and attract investments in this sector. Public financing alone will not be sufficient and needs private funding. This affords Qatar Development Bank(QDB) and Qatar Fund for development(QFD) to play a role in catalyzing the market take-off by working with their mandates to develop both the domestic and international markets respectively.

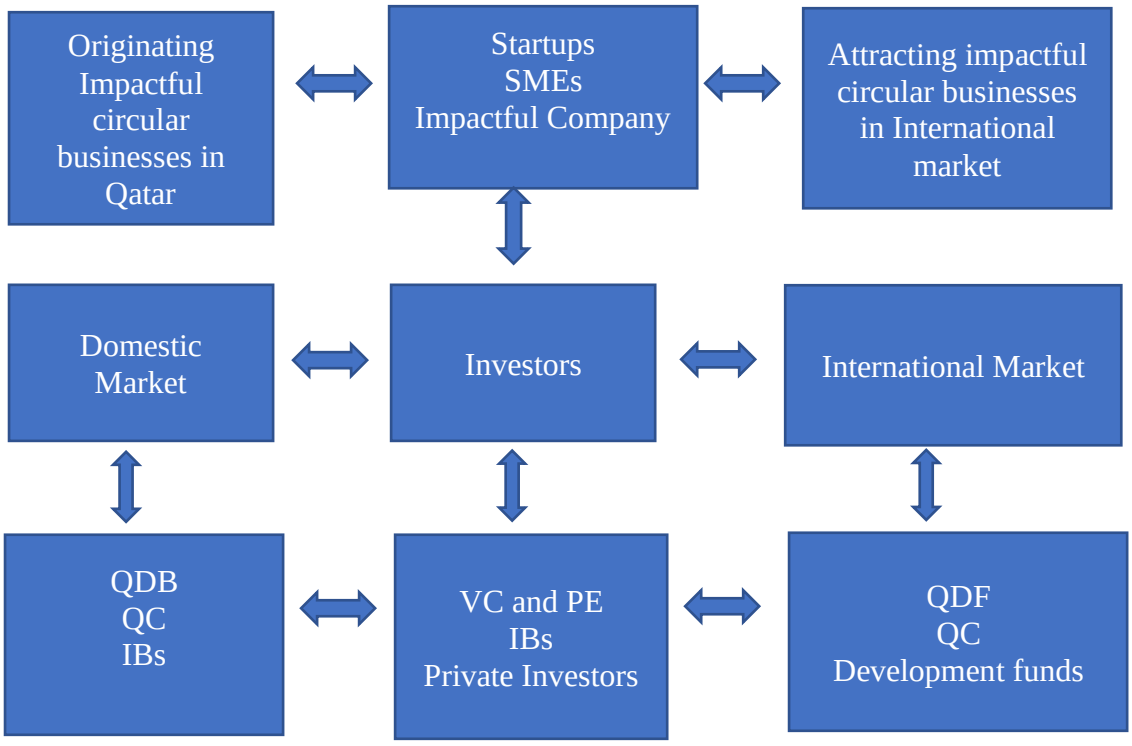
There has to be a strategy to attract and develop a secular economy ecosystem in Qatar and outside Qatar, and figure 5 presents the ecosystem matrix. Once the impactful business criteria are developed with a focus on economic diversification through CE, then the various stakeholders will be involved including Qatar Development Bank, Qatar fund for development, Islamic banks, conventional banks, government, investors, students, Qatar charity and so on. The various stakeholders in the industry are presented in figure 6.

Figure 6 Circular business ecosystem



Source: Authors'

Figure 7 Structure and Stakeholder in the Circular Business Ecosystem



Source: Authors'

Qatar development bank can play the role of providing some financial guarantees for investors by working with Qatar Charity in this regard. Third-party guarantees will help attract funding from Islamic banks such that the compassionate Islamic finance contract will be used to help

build businesses and grow SMEs that are pursuing circular business missions. They can also provide subsidy for the cost of funds through a blended Murabaha arrangement with banks who may want to advance financing to start-ups and SMEs. There can be various innovative financing arrangement such as Qard with profit such that the SMEs shares of profit with the Islamic bank or any bank in case profit is declared but pays only the principal when there is no profit. This may be controversial to some Shariah scholars, but it will also be an opportunity for Islamic banks to blend compassion with profitability.

Supporting the market development will require a mentorship, business advisory, and general incubation services, and these can be provided through Qatar Incubation Center, Qatar Science and Technology Park and the like with partnership with QDB. At the international level, Qatar has to be attractive for attracting top-notch talents and startups to start businesses, including circular businesses. Likewise, the domestic companies that can build their businesses competencies will be ready to go global. There is a potential to develop circular businesses in the international market, especially waste management. Qatar entrepreneurs can even export waste to other countries or launch a waste exchange where waste is traded. What QFD can do is to have an interest in catalyzing private investments into developed and developing countries by funding joint feasibility and scientific inquiry in collaboration with Qatar-based researchers and innovators. Figure 5 presents the circular business ecosystem which has domestic and international dimensions, which both are converging towards building startups and SMEs sector. Innovative Startups and SMEs will originate circular businesses at both domestic and international arenas. This business must be funded by investors as an impactful business; government-backed institutions can play a role. Domestic funding can be raised from QDB, QC, and Islamic banks. QDF, QC, and other development funds can play a role in fostering international circular business to Qatar, including VC, PE, private investors, and IB.

Conclusion

The linear economic principles if remain the norm of business practices and consumption patterns, the outcome is likely to be shortages of certain materials, growing price volatility, and continued environmental degradation. Tackling this challenge requires a new economic paradigm of the CE and Islamic finance has a role to play in the transition towards the CE. The study explores ways Islamic finance can support circular businesses and more specifically, how it can be used to help Qatar transition to a CE. The QNV2030 dedicates one of its 4 four pillars to environmental development owing to the resource constraints and the biocapacity deficit

experienced in Qatar over the years. The study concludes that Islamic finance can use equity-like and risk-sharing financing modes to support circular businesses motivated by the holistic objective of Maqasid. There is also the need for financial regulatory authorities and Islamic financial institutions to consider risks associated with climate change and linear economic activities in terms of asset valuation and pricing. Blended finance in Islamic finance is an important tool that can be used to foster investments and attract funding for circular businesses. The circular business financing ecosystem can be built in Qatar by combining the profitable and charitable sectors within the context of impacting the economy and driving CE growth. This will mean that QDB, QC, IBs and QF can work together to attract the needed funding for circular businesses within Qatar and also attracting entrepreneurial talents to Qatar to support CE transition. The paper recommends the following for policymakers and relevant stakeholders:

1. To develop a comprehensive CE policy masterplan to serve as a comprehensive reference for CE policy and strategy in Qatar as done by Singapore recently.
2. To embark on public awareness on the environmental constrains faced by Qatar and the need for a change of attitudes towards ecological preservation.
3. To engage with Islamic finance practitioners, academics and regulators to develop a roadmap for financing the circular businesses and the roles they can play.
4. To make the CE an important public policy target in achieving the SDGs in Qatar.
5. To dedicate funding for research into the CE for both academic and industrial researches.

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