# ICSCBTS 2022

1ST BDPF INTERNATIONAL CONFERENCE ON SUSTAINABLE CIRCULAR BUSINESS, TECHNOLOGY AND SOCIETIES

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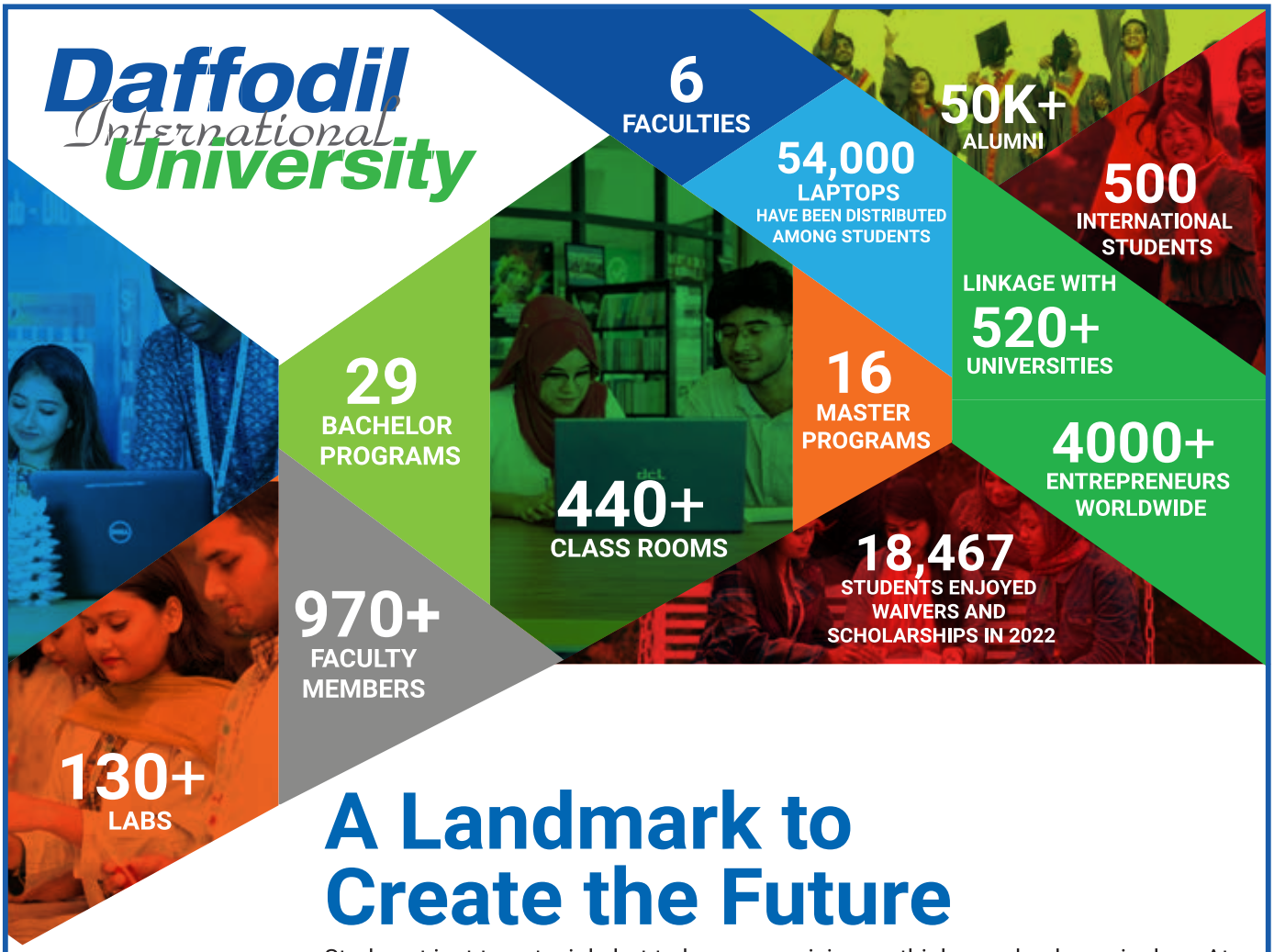


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# 1ST BDPF INTERNATIONAL CONFERENCE ON SUSTAINABLE CIRCULAR BUSINESS, TECHNOLOGY AND SOCIETIES (ICSCBTS 2022)

**BOOK OF ABSTRACTS**

**(An abridged version)**

NOVEMBER 5, 2022

HELSINKI, FINLAND

**BANGLADESH DOCTORATES' PLATFORM IN FINLAND (BDPF)**

BDPF publication series 2022



https://bdpf.net

ISBN 978-952-94-6948-2 (softcover)
ISBN 978-952-94-6949-9 (PDF)
BDPF Y-tunnus: 3117032-8

Hard copy printed by

Daffodil International University

Funding Partner

NORTHERN UNIVERSITY BANGLADESH

# STATEMENT BY THE CHAIR OF THE CONFERENCE

**DR. ANISUR R. FAROQUE**
**BDPF Executive Member (Education and Culture)**
Associate Professor
School of Marketing and Communication
University of Vaasa, Finland.

As the chair, I welcome you all to the First BDPF International Conference on Sustainable Circular Business, Technology and Societies (ICSCBTS 2022).

As you know, BDPF is a platform of 77 Bangladeshi doctorate scientists, who achieved their doctorate degrees in Finland from different academic backgrounds. The platform strives to provide space for intellectual exchanges and networking of multidisciplinary dimensions.

The objective of our multi-disciplinary conference is to exchange valuable knowledge and expertise from academic scholars and business practitioners within broader areas (not limited to) of business, technology, and society that contribute towards sustainable development globally.

The circular economy is a systems solution framework that tackles global challenges like climate change, biodiversity loss, waste, and pollution. It is based on three principles: eliminate waste and pollution; circulate products and materials; and regenerate nature. Therefore, a circular economy decouples economic activity from the consumption of limited resources. It is a resilient system that is good for business, people and the environment.

Businesses also have a major role to play in circular economy. Business sits at the heart of the transition to a circular economy. A circular economy transformation will empower us with the tools to tackle global challenges, and the power to create resilience and grow prosperity.

By bringing knowledge from diverse fields of the academia, BDPF wants to contribute to this objective. This is our first conference, and we would like to hold the conference every year or every two years to bring together the knowledgeable minds from all over the world to suggest solutions to sustainable and circular business, technology and societies.

I would like to thank all the members of the BDPF family, the executive members and the organizing committee members to make this conference happen today. I also thank all the participants to make the conference successful. My special thanks and gratitude go to our two distinguished keynote speakers, Professor Dr. Abu Yousuf Md. Abdullah and Dr. Md. Sabur Khan.

# STATEMENT BY THE CO-CHAIR OF THE CONFERENCE

**DR. AHM SHAMSUZZOHA**
**Member of Advisory Board, BDPF**
Associate Professor
School of Technology and Innovations
University of Vaasa, Finland

On behalf of the 1st International Conference on Sustainable Circular Business, Technology and Societies (ICSCBTS 2022), organized by Bangladesh Doctorate Platform in Finland (BDPF), it is a great honour and pleasure for me to welcome you all. At this conference, the aims are to disseminate innovative research and to communicate recent advances in the field of science and technology. Moreover, the conference aims to provide a platform for delegates from both academia and industry, who wish to exchange pioneer ideas, get to know each other better, and present their research within the wider community. It is believed that the presented quality articles will provide important contributions to the promotion of scientific ideas, algorithms, and methods globally. This 1st BDPF conference brings together a multidisciplinary group of researchers from around the world.

I would like to thank everybody who contributed to the success of this conference, including all the authors, the program committee members, and the keynote speakers, Professor Dr. Abu Yousuf Md. Abdullah and Dr. Md. Sabur Khan for contributing their state-of-the-art research works, that made the conference a memorable event. Finally, I am especially grateful and would like to express my heartfelt thanks to all honourable BDPF members and the conference committee for their help and suggestions to make this conference a successful one.

## STATEMENT BY THE PRESIDENT, BDPF

**DR. MD. MUNJUR E. MOULA**
Aalto University, Finland
Chairman and Founder
Circular Family in Bangladesh

It is my honour and privilege to address the 1st International Conference of Bangladesh Doctorates Platform in Finland (BDPF). The theme of the conference- Sustainable Circular Business, Technology, and Societies- is challenging but very pertinent for society today.
Our theme is perhaps best captured through the concept of a sustainable circular society. While this is a rather novel concept, the consensus among scholars is that a human-friendly environment, fundamental basic needs, freedom, openness, democracy and creativity are aligned in a sustainable circular society.

The immense technological progress which has taken place over the past 100 years has produced unprecedented social inequality. This remains as one of the key premises of addressing sustainability. It requires societal movement from the traditional philosophy of linear processes to a novel economic model in the industrial sector: the circular economy.
We are meeting at a significant moment. Indeed, this year marks the 4th anniversary of Bangladesh Doctorates Platform in Finland (BDPF) and I am confident that BDPF will continue to be a critical knowledge contributor towards the sustainable developments of tomorrow.

Our world-class speakers, today, will offer the latest insights about how to move from linear to circular economy, and in turn construct a sustainable circular society. I am confident that your active participation and contributions will make today's program a great success. I hope that this conference acts as a catalyst for collective collaboration in constructing the defining sustainable solutions of the future.

On behalf of Bangladesh Doctorates Platform in Finland, I thank the conference organising committee, keynote speakers, presenters, and participants for your individual contributions.

## STATEMENT BY THE MEMBER SECRETARY, BDPF

**DR. A.K.M YEASINUR RAHMAN**
Researcher
University of Eastern Finland, Finland

It is my great pleasure to welcome you to our BDPF 1st International Conference on Sustainable Circular Business, Technology and Society (ICSCBTS). The theme of the conference is to create innovative ideas, initiatives, models, and strategies that contribute to developing sustainable circular business, technology, and society. In addition, the conference intends to build a new network of experts, researchers, academicians, and entrepreneurs for sustainable development.

I would like to express our gratitude to the ICSCBTS conference committee, keynote speakers, presenters and participators. We, the scientific community, will work together for better human well-being. I am proud of what the BDPF family have done to complete this ICSCBTS conference successfully.

## STATEMENT BY THE KEYNOTE SPEAKER-1

**DR. ABU YOUSUF MD. ABDULLAH,** *Ph.D., D. Litt(h.c.)*
Kotler Distinguished Professor of Marketing
Professor, IBA, University of Dhaka
President, Northern Education Group (NEG)
Chairman, Praasad Group of Companies
Founder, Bangladesh Institute of Modern Marketing (BIMM)

### The Textile Industry and its Implications on Climate: A Glimpse of the Circular Economy in the Context of Bangladesh

No other challenge has been bigger than climate change for the 21st century world. The objective of my speech, therefore, is to shed light on the actual impacts of the textile industry on our environment in the context of Dhaka, Bangladesh. Besides sharing my views on the importance of circular economy, I will also be offering my thoughts on how we can minimize the harmful impacts of the textile industry.

Numerous facts and figures published by the world-renowned organizations have proved time and again that the textile industry is largely responsible for greenhouse gas emission, land and water contamination and wastage, soil erosion and so on. What's more, it is directly responsible for the suffering of the 4 million people working in this industry who, being exposed to unhygienic and toxic work environments, are giving birth to disabled future generation.

However, neither the scientists nor the policymakers have been able to come up with well-grounded solutions to prevent the resulting climate crisis. The reason is simple - clothes are a form of fundamental human needs.

Regardless, it is high time Bangladesh, despite its economy being heavily dependent on garments exports, took steps to alleviate the sector's detrimental effects. We are striving for fast but consistent economic growth, so we need to devise sustainable solutions without waiting for the developed nations to come to our rescue. And we can do this only by implementing the concept of circular economy in our country. Just for an example, by moving to a circular system, Bangladesh could sell 250 thousand tons of 100% pure cotton waste to the recycling

market for up to 100 million dollars. And if reused in Bangladesh, it could decrease cotton imports by around 15%, saving half a billion dollars.

Most important, we need to move from our profit-oriented mindset to people- and planet-oriented mindset to resolve this issue. Profit certainly is a key objective of any business initiative but if there is no people or planet in the picture, would such activities matter?

Therefore, circular economy must be put into action in Bangladesh on an immediate basis. Thankfully, several organizations and consumers have realized its value and have started practicing it to a reasonable extent. Academic institutions like Northern University Bangladesh are offering their students specialized course on circular economy. Millennials and Gen Z people are increasingly becoming serious about the conservation of environment and are showing eagerness to learn circular economy. Thus, I feel hopeful that in the coming days, our future generations will surely enjoy the benefits of circular economy at every aspect of their lives.

## STATEMENT BY THE KEYNOTE SPEAKER-2

**DR. MD. SABUR KHAN**
Chairman of Daffodil International University (DIU) and
Daffodil Education Network (DEN), Bangladesh

### Circular Economy: A Potential Pathway to a Sustainable Development of Bangladesh and the Role of a University

Circular Economy (CE) is not only a question of economy, or environment, or even production; it is a triangle. The CE combines concepts such as economy, environment, production, and society. A Circular Economy (often referred to simply as circularity) is an economic system aimed at eliminating waste and the continual use of resources. A circular economy is a system of resource utilization where reduction, reuse, and recycling prevail. A CE is in contrast to the traditional linear economy.

The economy of Bangladesh has been linear for a long time, where raw materials are used to make a product. After its use, any waste, such as packaging, is thrown away into the environment since the environment is considered a free ride in a linear economy. However, we are consuming a finite supply of material resources, producing toxic waste for the environment, which can't be continued for long. It is time to break from the 'take-make-use-dispose' pattern of growth. The concept of 'circular economy (CE)' is about closing this loop. It is based on the principle of a natural ecosystem where there is no waste output focusing on reducing, reusing, and recycling the elements. CE follows the 'Raw material—design—the production-remanufacturing-distribution-consumption-repair-reuse-residual waste-recycling' growth pattern.

In Bangladesh, to ensure the required food, water, and prosperity in the coming years, it is high time to switch from a linear to a circular economy for some reasons, such as the large population and its impact on the environment, constraints of resources, and protection of the environment from all kinds of pollution such as Bangladesh is now one of the top twenty plastic polluting countries in the world.

A comprehensive and holistic approach is needed to transform from a linear to a circular economy where a concerted collaboration between the public and private sectors is a must. A

strong commitment and serious determination are needed to promote and support the exchange of information between researchers, public administrations and businesses and industries, and social stakeholders. The Government of Bangladesh is taking measures to inform business owners, entrepreneurs, and consumers about the importance and benefits of CE. However, for a country like Bangladesh, moving from a linear economy to a circular economy is challenging for reasons such as inefficient household and industrial waste collection and treatment systems, lack of awareness, lack of understanding of CE, capacity shortages, unfavorable behavioral norms, etc.

A good number of companies and government organizations are practicing CE in their business operations, such as a garments manufacturer producing napkins using leftover clothes (Jhuta), electronics companies taking old television back, the government has established Central Effluent Treatment Plant (CETP) in Savar to process tanneries' harmful waste, paper packets are made by reusing used paper, the government is implementing the generation of 10% of its total energy from renewable sources, the use of wastewater for irrigation in Rajshahi since 1976.

As a tertiary-level academic institution, Daffodil International University (DIU) has integrated CE into the university's academic programs. Besides, DIU has embedded CE principles in its operations in many ways, some of them are the environment-friendly green campus; use of digital platforms and learning management systems named Blended Learning Centre (BLC) for all academic programs; SmartEdu for administrative and academic operations; Daffodil 1 Card to lessen the use of paper money; DIU e-library consisting of numerous e-books and other learning resources; on-campus electric vehicles reducing net carbon emission. These practices depict the commitment and role of DIU to the Circular Economy.

**CONFERENCE PROGRAM**

**First BDPF, International Conference on Sustainable Circular Business, Technology and Societies (ICSCBTS), 2022**

**05.11.2022 at Virtual Platform from 10.00-14.00**

**Conference Program**

10.00-10.10 Welcome speech
Dr. Md. Munjur E. Moula
Founding President, Bangladesh Doctorates Platform in Finland (BDPF)
President, Social Acceptability Study Network, Aalto University (2019- 2022), Finland

10.10-10.15 Opening words from Conference Chair
Prof (associate) Dr. Anisur R. Faroque, DSc., PhD.
Executive Member, Education and Culture, BDPF
University of Vaasa, Finland

10.15-10.35 Keynote 1 Title: World Textiles Industry and Climate Change: A Bangladesh Case
Prof Abu Yousuf Md. Abdullah
Chairman, Northern University, Bangladesh
Prof. University of Dhaka, Bangladesh
Chairman, Prashed Group Ltd. Bangladesh

10.35-10.50 Keynote 2 Title: Circular Economy: A Potential Pathway to the Sustainable Development of Bangladesh and the Role of a University
Dr. Md. Sabur Khan
Chairman, Daffodil International University, Bangladesh

10.55-11.00 **Virtual coffee break**

**Session 1: Track - Society, Business and Economics**
*(Session Chair and Co-chairs): Dr. Ahm Shamsuzzoha* (Advisor, BDPF) *Dr. Tahmina Khanam* (Executive Member, BDPF), *Dr.Yeasinur Rahman* (Member Secretary, BDPF)

11.00 -11.15 Paper 1: Public perception of circular economy in Bangladesh (Md. Munjur E.Moula1, Mesbaul Islam Anindo, **Laboni Sarkar**, Tahamina Khanam,

Abul Rahman, Papia Basu, Rakibul Hasan, Sahadat Hossain Arman, Ashiquzzaman Sohan, Md.Alamin Hossain, Abu Yousuf Md. Abdullah)

11.15 -11.30 Paper 2: Living, Studying, and Working in a Multicultural Environment: Issues to be Taken into Consideration (**Shaidul Kazi**, Advisor BDPF)

11.30 -11.45 Paper 3: Effects of a Sustainable Gamified System for Economically Disadvantaged Students in Bangladesh (**Mehnaz Alam**, Md Sanaul Haque)

11.45 -12.00 Paper 4: Governance of Social Safety Net Programs, responding to Emergencies in Bangladesh (**AKM Saifullah**, EC Member, BDPF)

12.00-12.05 **Virtual coffee break**

**Session 2: Track - Engineering and Technology**
*(Session chair and Co-chairs): Dr. Shaidul Kazi* (Advisor, BDPF) *Dr. Shafiqul Alam* (Executive Member, BDPF), *Dr. Sanaul Haque* (Executive Member, BDPF),

12.05 -12.20 Paper 1: Supply and logistics chain management through positioning technologies: a systematic literature review (**Ahm Shamsuzzoha,** Advisor BDPF)

12.20 -12.35 Paper 2: Diabetic foot ulcer detection using Faster R-CNN algorithm (**Pranta Protik** and G M Atiqur Rahaman)

12.35 -12.50 Paper 3: Can the human eye accommodate in the correct direction just by itself without relying on other visual cues? (**Najnin Sharmin** and Brian Vohnsen)

12.50-12.55 **Virtual coffee break**

**Session 3: Track - Sustainable Development**
*(Session chair and Co-chair): Dr. Golam M. Sarwar* (Advisor, BDPF), *Dr. AKM Saifullah* (Executive Member, BDPF), *Dr. Md Abdul Hai* (Executive Member, BDPF)

12.55 -13.10 Paper 1: Sustainable Management: A Review of the Practices in the Real World and Implications for Organizations with Resource Constraints (Moslehuddin Chowdhury Khaled and **Tamanna Binte Zaman**)

13.10 -13.25 Paper 2: Title: Is refugee flux declining forest area and degrading global climate? - A Case study in Bangladesh (**Abul Rahman**. Tahamina Khanam, Paavo Pelkonen)

13.25 -13.40 Paper 4: Development of E-Waste Reverse Supply Chain and a Web-Based Electronic Waste Management System (Mohammad Iqbal, **Faysol Siddique**, Dipika Biswas, Ahm Shamsuzzoha)

13.40 -13.55 Paper 5: Use of Smartphone Technology during COVID-19 Pandemic in Bangladesh (**Mohammad Iqbal**, Shahrin Iqbal, Salma Akhter, Ahm Shamsuzzoha)

**13:55 – 14:00 Closing ceremony: Expression of appreciation from BDPF Secretary**
Dr. Yeasinur Rahman

# ABSTRACTS AND AUTHORS

## Is refugee flux declining forest areas and degrading global climate? - A Case study in Bangladesh

Abul Rahman. Tahamina Khanam, Paavo Pelkonen

School of Forest Science
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### Abstract

Refugee migration is one of the main problems in the current world that directly and indirectly exacerbates the global climate change issue. The Rohingya refugee crisis in Bangladesh, particularly in the south zone of Cox's Bazar, is a critical condition. Since August 25, 2017, the influx of refugees from Myanmar to this region has become the fastest and densest in the world. As a result of the Rohingya influx in the first three months, approximately 1619 hectares of land covered with reserved and 15-year-old social forests have been cleared in Cox's Bazar for fuelwood supply and building temporary shelters. In light of this situation, we have outlined three scenarios along with possible solutions. This article aims to identify and comprehend three types of vulnerable impacts that might arise from the deforestation situation in these areas: environmental impacts (carbon loss and impact on biodiversity), economic impacts (loss of earnings from forest products, e.g., carbon loss), and social impacts (competition between local people and Rohingyas in fuel, food, water, and shelter).This article provides clear information about the deforestation and environmental degradation situation in the South Forest Zone of Bangladesh. Furthermore, it identifies carbon loss and estimates future environmental impacts, connecting them to a global perspective to illustrate how local environmental degradation can have global implications.

*Keywords:* climate change, carbon loss, Rohingya

### Authors' biographies

Abul Rahman, a dedicated researcher at the University of Eastern Finland, is an accomplished scholar with a diverse academic journey. As an Erasmus Mundus scholar, he completed his Master's in European Forestry across Sweden and Finland, showcasing a global perspective in his education. Building on this foundation, Abul earned a Ph.D. in Forest Science, followed by a postdoctoral stint at a renowned Forest IT company. With a rich portfolio of scientific publications in forest ecology, people's perceptions, and social acceptance, he has made substantial contributions to these fields. Abul's research interests, spanning circular bioeconomy, bioenergy, GIS, remote sensing, and forest ecosystem services, highlight his commitment to understanding and addressing complex environmental challenges, emphasizing the intersection of scientific knowledge and societal perspectives.

Tahamina Khanam, currently a dedicated researcher at the University of Eastern Finland, has forged a distinguished academic and professional path. Commencing her journey as an Erasmus Mundus Scholar, she earned her Master's degree in Economics and Management of Network Industries from esteemed institutions in France and Spain, showcasing a keen interest in the intricate dynamics of network economies. Subsequently, Tahamina pursued and completed her Ph.D. and postdoctoral

research in bioenergy economics at the University of Eastern Finland, solidifying her expertise in the sustainable energy sector. Her professional experience extends to a year in the network investment sector with former France Telecom (now named Orange) in Paris, providing valuable industry insights. Following her Ph.D., Tahamina further enriched her academic pursuits as a visiting researcher at the prestigious Judge Business School of the University of Cambridge, UK. Her research interests, spanning energy economics, structural change, climate adaptation, bioeconomy, and the nuances of people's perceptions and acceptances, underscore her commitment to addressing contemporary challenges at the intersection of economics and sustainability.

# Diabetic foot ulcer detection using Faster R-CNN algorithm

Pranta Protik[1], G M Atiqur Rahaman[*1]

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## Abstract

Diabetic Foot Ulcer (DFU) is one of the major health complications for people with diabetes, which, if not detected at the early stage and treated properly, may lead to amputation and sometimes life-threatening situations. Around 15% to 25% of diabetic patients contain the possibility of developing DFU at a later stage if proper foot care is not taken. The treatment of this disease is a global health care problem and the currently available clinical treatments greatly rely on the vigilance of patients and doctors thus resulting in high diagnostic costs along with lengthy treatment procedures. These available clinical treatment procedures involve a thorough evaluation of the patient's medical history as well as careful examination of the feet wounds by a DFU specialist. Sometimes, the treatment processes may require some additional tests too like CT scans, X-Ray etc. Even though this treatment procedure gives the patient a powerful and positive outcome, it requires a significant amount of time as well as creates a notable amount of financial implication on the patient's family. Hence, the necessity of a cost-effective, remote and fitting DFU diagnosis technique is imminent. In this paper, we propose a deep learning-based approach to detect diabetic foot ulcers through images taken from the diabetic patient's feet. The design of our proposed method is based on Faster R-CNN algorithm. We introduced some modifications and a few changes in the parameter settings of this algorithm to make it perform better in case of DFU detection. The image dataset that has been used for this work is a part of the Diabetic Foot Ulcers Grand Challenge 2020 (DFUC2020) challenge. We used a total of 2000 images from this dataset for this experiment and randomly divided them into 1600 images (80%) and 400 images (20%) for the training set and testing set respectively. The images included in this dataset were captured with different types of cameras with different focal lengths from various view angles resulting in varying blurring and zooming levels. Along with these issues, our training dataset has only 1600 images which is considered a small amount in case of deep learning models. So, we introduced data augmentation in order to overcome these issues. Also, in case of DFU related images, sometimes the area of interests is too hard to detect for the Faster R-CNN with default configuration values due to the smaller size of the lesions. In order to include those cases, we modified the anchors size and ratio so that the smaller regions don't get missed and the accuracy of detecting those regions is increased. In some other cases, the DFU infected areas of the foot may not display any significant difference with the healthy skins on the foot in which cases the algorithm may have a hard time detecting those regions. To solve this problem and improve the number of accurately detected areas, before passing the images to the algorithm we process the photos accordingly to highlight the border areas of the infectious regions so that those areas

are not ignored. Along with these improvements in order to reduce the response time and increase the precision of the algorithm a value of 50 ROIs is used rather than the standard value of 300 ROIs. In our experiment, the area detected by the algorithm is considered to be correct if the value of intersection over union (IoU) is greater than 0.5. The model is then trained for 100 epochs using the pre-trained weights for ResNet-50 on ImageNet image dataset. Our proposed technique achieved precision, recall, F1-score and mean average precision of 77.3%, 89.0%, 82.7%, and 71.3% respectively in DFU detection which is better than results obtained by the original Faster R-CNN.

*Keywords:* Diabetic Foot Ulcers, Object Detection, Convolutional Neural Networks, Deep Learning, Faster R-CNN

**Authors' biographies**

Pranta Protik received his B.Sc. Engg. degree in Computer Science and Engineering from Khulna University, Khulna, Bangladesh in 2019. He is currently pursuing M.Sc. Engg. degree in Computer Science and Engineering from Khulna University. His research interest includes computer vision, machine learning and deep learning.

G M Atiqur Rahaman is working as a faculty member in computer science and engineering discipline of Khulna University since 2004. He was rewarded PhD Degree in Computer Science by the School of Computing, University of Eastern Finland. He earned Licentiate of Technology degree in Engineering physics from Mid Sweden University. He completed Erasmus Mundus double degree M.Sc. in Color Informatics and Media Technology from four European Universities with specialization in image, vision and signal. His research area includes spectral imaging, image analysis, computer vision, machine learning and color science.

# Public perception of circular economy in Bangladesh

Md.Munjur E.Moula[1*2], Mesbaul Islam Anindo[3,] Janna Sorvari[4] , Laboni Sarkar[5], Tahamina Khanam[6], Abul Rahman[6] , Papia Basu[2], Rakibul Hasan[2], Sahadat Hossain Arman[2], Ashiquzzaman Sohan[2], Md.Alamin Hossain[2] , Md. Ariful Islam[2], Abu Yousuf Md. Abdullah[2,5]

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## Abstract

Moving from linear to circular economy in Bangladesh, requiring public perception which is one of the major driving forces. Public perception can contribute to the implementation of circular economy in Bangladesh. There has been no research on this topic done before. This exploratory, survey-based study of 247 respondents investigates public perception in terms of public awareness and knowledge towards circular economy implementation, using a multiple-choice questionnaire that was designed with three groups of questions: background information, environmental awareness in terms of circular economy implementation, and willingness to share information about the importance of circular economy. Public perceptions of circular economy were evaluated through quantitative analysis and content analysis, which was applied to analysis the robustness of survey results. The study indicates that 98% of the respondents have no idea with the term circular economy. Public awareness of the circular economy concept also has a positive correlation with them at age level and gender differences, such individuals (35%) believing that environmental awareness could support to implement circular economy in Bangladesh. The study results show that 83.7% of total respondents want to reuse second hand product at their home, and 80% respondents want to share information about the importance of circular economy with their family members, neighbours' and alike. This study provides an initial step towards better understanding about why public perception is required to support the process of circular economy implementation in Bangladesh.

*Keywords:* circular economy; public perception; environmental awareness

## Authors' biographies

Dr.Md. Munjur E. Moula (Visiting lecturer and founding president of Social Acceptability Study Network at Aalto University and visiting professor and adjunct faculty at Northern University Bangladesh.

M.Phil Laboni Khatun Sarkar (University of Dhaka).

Professor Dr. Abu Yousuf Md Abdullah (Chairman, Northern University Bangladesh).

Mesbaul Islam Anindo (Yale-NUS Collage, Singapore).

Papia Basu, Rakibul Hasan, Sahadat Hossain Arman, Ashiquzzaman Sohan, Md.Alamin Hossain and Md. Ariful Islam (Northern University Bangladesh).

Tahamina Khanam, University of Eastern Finland

Abul Rahman, University of Eastern Finland

# Role of Hypoxia signalling pathway in COVID-19 infection

Karim Ullah

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## Abstract

The outbreak of COVID-19 caused by SARS-CoV-2 (severe acute respiratory syndrome) has caused a severe pandemic globally. In 2020 the virus-infected around 56 million people, and 1.5 million people already died due to this fatal atypical pneumonia caused by COVID-19. The respiratory system is mainly affected by COVID-19, although several other organs such as the lung, heart, kidney, and gastrointestinal tract can be affected by SARS-CoV2. Severe illness with COVID-19 infection is common in patients with a history of preexisting chronic diseases such as diabetes, hypertension, or chronic obstructive pulmonary disease (COPD). For example, lung cancer patients are highly vulnerable to COVID-19 infection. This novel SARS-CoV2 virus shares sequence similarities with the previously identified SARS-CoV virus that caused the SARS pandemic in 2002. The genome of SARS-CoV2 shares 79.2% sequence identity to SARS-CoV and approximately 96% identity to the bat coronavirus BatCoV. The COVID-19 infected patients show different types of symptoms ranging from mild to severe acute respiratory distress syndrome (ARDS) and result in pneumonia in the lung, which in severe cases can lead to the death of the patients. ARDS is characterized as an inflammatory response caused by the accumulation of immune cells in the lung. Besides, ARDS COVID-19 mainly impair oxygen supply in the lung and creates local hypoxia. A clear link exists between hypoxia and inflammatory response, and activation hypoxia signalling can induce the expression of several hundred genes known to facilitate the proliferation of inflammatory cells. Therefore, we hypothesized that hypoxia-inducible factor (HIF) might have a potential role in COVID19 infection, and manipulation of components of HIF signalling may offer a potential therapeutic opportunity for the treatment of COVID-19 infection.

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## Author's biography

I Karim Ullah, completed my Ph.D. in Biochemistry and molecular biology from the University of Oulu, Finland. My research mainly focused on molecular medicine. During my Ph.D. thesis, I worked with Professor Johanna Myllyharju on the role of major regulators of hypoxia signaling pathways in inflammation and cell death and the development of kidney infiltration. Previously I was working as a research fellow with Dr. Olle Sangfelt at Cell and Molecular biology department (CMB), Karolinska Institute, Stockholm, Sweden.

# Can the human eye accommodate in the correct direction just by itself without relying on other visual cues?

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## Abstract

The aim of this study is to examine the effectiveness of the accommodative response of the adult human eye when subject to both foveal, parafoveal and perifoveal stimuli. This is a study also to clarify whether foveal and parafoveal vision drives accommodation in the correct direction or not, by removing out-offocus blur before relying on any other cues. In addition, the influence of microfluctuations on accommodation process has been studied as it is considered to play important rule in the direction detection process during accommodation. A near-IR laser diode (850 nm) and a fast Hartmann-Shack wavefront sensor (Thorlabs) were used to capture ocular aberrations up to the 4th Zernike order at 20 Hz framerate. A motorized iris placed in the conjugate pupil plane was used to limit the effective pupil to 2.5, 3.5, or 4.5 mm pupil for foveal accommodation while for parafoveal and perifoveal measurements it was fixed to 3 mm to limit the monocular vergence. In all cases, a green fixation target on a monitor at 1-m viewing distance was used. A random sequence of step defocus changes every 10 sec. was induced by a current-driven tuneable lens within the accommodative range of each subject. A near-IR laser diode was used together with a Hartmann-Shack wavefront sensor to capture Zernike aberrations in real time (20 Hz) during the accommodative response. For foveal and microfluctuations measurements subjects viewed a Maltese cross whereas for parafoveal and perifoveal measurements annular targets from 2° to 16° were used. A total of 20 subjects in the age range of 22 – 49 years were characterized for three different measurements. The results show that the accommodative response acts in the correct direction to compensate defocus but with a reduced amplitude of response at increased eccentricity (largely absent at 14°). Moreover, it was found that the accommodation reaction time is not faster than neural processing time which means the eye cannot complete the accommodation process only by itself. It was also found that in the absence of microfluctuations accommodation would still be in the correct direction. Fig.1. Induced defocus sequence (Tuneable lens: black line) and accommodation response (Eye: red line) measured with a Hartmann-Shack wavefront sensor as a function of time for an emmetropic subject at (a) fovea (2° eccentricity), (b) parafovea (6° eccentricity) and (c) perifovea (16° eccentricity). Blinks have been numerically suppressed in the presented data.

*Keywords*: Accommodation, Aberrations, Defocus, Emmetropization, Myopia.

## Acknowledgements

This work was supported by European Union's Horizon H2020 ITN MyFUN project funded by Marie Curie scholarship, grant agreement no. 675137.

## Author's biography

My name is Najnin Sharmin, I have completed my PhD in Visual Optics from University College Dublin, Ireland under European Union's Project "MyFUN" which was a collaborative project between 7 different European Universities and Companies. During my PhD, I also worked at KTH Royal Institute of Technology, Sweden (2018) and at University of Tubingen, Germany (2019). I have done my Master's degree in Photonics from University of Eastern Finland, Finland (2015) and Bachelor's degree in Physics from Shahjalal University of Science and Technology, Bangladesh (2012). My hometown is Habiganj but I completed my schooling from Akhaura due to my Father's job posting and then moved to Sylhet for my further studies. I love travelling, photography, drawing beside my research work.

# Effects of a Sustainable Gamified System for Economically Disadvantaged Students in Bangladesh

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## Abstract

Now-a-days, digital technologies are valuable resources for student's academic and social development (Anderson, 2010) such as a gamified system for students. Socio-economically disadvantaged students in Bangladesh at a primary level mostly lack the opportunity of using modern technology for their educational growth. Using technology-enhanced learning in school are most valuable i.e., improving math quiz and puzzle via a cost-effective platform. The implementation of a gamified system in tutoring students is expanding rapidly. A gamified system makes educational modules or topics simple, understandable, and interesting for students (Deved, 2006). It can be predicted that in future, various gamified systems will be accessible to the users based on their topic of interest. Hence, an assessment method and tool are vital to access the performance and quality of the digital learning systems and suggest the proper learning system, and the impact of gamification techniques in the context of socioeconomically disadvantaged students are not available widely. Hamari et al. (2014) coined out the following as a methodological limitation on a gamified learning system: small sample sizes, proper psychometric measurements were not applied while surveying user experience, some experiments only considered users evaluation, no consideration for individual motivational affordance, absence of multilevel measurements, for example, psychological and behavioural outcomes. There is, however, few information about utilizing content gamification learning pedagogy to examine the learning system quality. The study aims to focus on introducing content gamification learning pedagogy in a gamified system that can have a significant effect on different learners. Content gamification uses game-play mechanics for non-game applications (Deterding et al. 2011). Gamification, particularly content gamification can assist students in multiple areas within an institution to improve learning performance (Geelan et al. 2015). Thus, the expected outcome in using the gamified learning system can also change significantly. The focus question of the study is: What is the effect of the Content Gamified Learning Pedagogy in the digital learning system to motivate economically disadvantaged students? To answer the research question, Cognitive Social Learning Theory (CSLT) Bandura (1986) will be utilized in this study that supports design instruction and the gamification of learning. The contribution of this theory is the instructional design of a gamified system and the students' education and learning experience. Its design involves problem-solving and decision making of the students. Kahoot will be applied as an interactive gamified learning platform among the students. This social learning system will be set up to have the students, interact with artefacts within the game and other students online. Problem-solving strategies concerning quiz such as mathematics puzzle will be practised and refined within this learning context. Based on the tools of accessing performance and quality, this gamified learning system will be guided by design thinking approaches such as human-centered design i.e., students will be engaged to design the mathematics puzzle and quiz within the Kahoot-based gamified system. The result of the study can assist us to understand how a

gamified system can be designed and developed to motivate economically disadvantaged students towards their education and learning.

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## Authors' biographies

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He has been conducting multidisciplinary collaborative research activities. His research area covers persuasive technology and gamification towards digital solutions. His research aims at how digital interventions can be sustained through the users' behavioural change perspective. He is co-supervising three PhD students, one Master student, and teaching over five modules at a Master level. He has published over 30 publications in prestigious journals and conferences.

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# Living, Studying, and Working in a Multicultural Environment: Issues to be Taken into Consideration.

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## Abstract

Cross-border movement of human being has never been so intense as it is now. Nowadays, it is quite common that people born in one country, study to another country and still work to a third country. In addition, people move and settle from one country to another country due to higher standard of living, family reason, business activity and political asylum. Based on time duration, human movement from one country to another could be termed as short-, medium-, and long term. Movement for travelling, task- based business activity, exchange study program, visiting relatives, and work-practice could be entitled as short-term movement of people from one country to another. For degree study purpose and fixed-term job could be considered as medium-term movement. Finally, moving to another country, for instance, living for permanently or study and stay could be considered as long-term movement. The main concern of this text is to suggest how to make living, studying, and working in a multicultural environment ease and smooth. Multicultural environment means an environment where more than two cultural communities live and work side by side. This paper is written particularly for the student and working community people but not excluding anyone living in a multicultural environment. Human being differs in many ways including cultural differences. Culture is a learning property where surrounding environment plays a vital role. The cultural learning process starts from early childhood and continues rest of the life. However, human brain plasticity matures at the age of about ten years old, but it never stops – human brain plasticity is a continuous process. Therefore, we learn new things all the time though age has an impact to the learning process. At the early age, we learn new things quite quickly but as we grow up learning new things may slow down. The objective of this writing is to focus on ways and means how to get adapted to a multicultural learning, working, and living environment. Though the primary discussion viewpoint will be general but Finnish perspective will be referred whenever it needs. The paper will be based on theoretical as well the personal experience of the author gained from living, studying, and working in a multicultural environment.

*Keywords:* Culture, multicultural environment, human movement, cultural adaptation, learning process.

## Author's biography

Has wide experience in working with people from different countries and cultures. Has over 15 years of teaching experience. Also worked as HR manager, market supervisor, and sales and purchase representative. In addition, has extensive experience in working at own farmhouse.

Highly motivated in teaching business related courses at bachelor- & master level as well as coaching- and supervising students' project and thesis. Interest in writing article, column and opinion on different socio-cultural and business-related issues to newspaper at home and abroad. Conducting, qualitative applied- & action research are also part of interest.

Specialities: cultural intelligence, multicultural competence, cross-cultural management/communication, HRM, entrepreneurship, organizational change/development, international business, Asian studies.

# Supply and logistics chain management through positioning technologies: a systematic literature review

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## Abstract

In today's digitalized world, supply chain and logistics management is critical for business growth. In this perspective, it is important to track and trace the supply and logistics chain to ensure safety and security within the delivery and transportation industries. Tracking and tracing provide necessary visibility, trust and authentication among organizations that works as catalyst for their business successes. In today's rapid development of emerging technologies and tools, enable manufacturing companies or firms to monitor and manage their supply and logistics chains smartly across their operational boundaries. The needs for tracking and tracing of delivery items are mostly ensured through various available positioning technologies such as Radio Frequency Identification (RFID), Internet of Things (IoT), bar codes, Quick Response (QR) codes, Global Navigation Satellite Systems (GNSS), Ultra-Wide Band (UWB), Wi-Fi, blockchain, etc. The deployment of all these positioning technologies and tools varies from one specific segment to another one based on the needs. Precision positioning is nowadays a huge concern for the supply chain and logistics providers with the respect to ensure accurate location of the delivery items that can support to eliminate or minimize the risks of delivery delay. It is worthy to mention that the precision positioning can be concentrated to both outdoor and indoor environments. The application of the available positioning technologies also varies between outdoor and indoor environments. In case of hybrid positioning, there needs a combination of technologies in order to provide necessary positioning for both indoor and outdoor environments. Based on the operational environment, it is critical and challenging to select appropriate technologies and tools for achieving precision positioning with higher efficiency and reliability. The aim of this research study is therefore to conduct a systematic literature review to develop a generic methodology that can be useful for the selection of appropriate technologies and tools to achieve precision positioning for both indoor and outdoor operational environments. It is believed that the outcomes from this research study would be a supportive roadmap for supply chains and logistics providers to provide necessary tracking and tracing solutions of their delivery items efficiently. Moreover, this study also aims to find out the existing bottlenecks or challenges of each of the available technologies and tools before deploying them for necessary tracking and tracing solutions of the supply chains and logistics providers.

*Keywords*: Supply chain management, logistics providers, tracking and tracing, positioning technologies, systematic literature review.

## Author's biography

Ahm Shamsuzzoha has been working as an Associate Professor (Tenure Track) at Digital Economy Platform, School of Technology and Innovations, University of Vaasa, Finland. He received his PhD in

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# Development of E-Waste Reverse Supply Chain and a Web-Based Electronic Waste Management System

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## Abstract

E-waste is any refuse created by discarded electronic devices and components as well as substances involved in their manufacture or use. The disposal of electronics is a growing problem because electronic equipment frequently contains hazardous substances. At present, the amount of e-waste is growing rapidly in Bangladesh and to mitigate its negative influences on the environment and society, it is necessary for Bangladesh to establish appropriate strategies in order to manage e-waste and it should be conducted in a safe and standardized way. Previously Bangladesh government has adopted some policies and legislation but it was not implemented properly. The objectives of this paper are to propose a web-based e waste management model for Bangladesh and to propose a web-based e-waste management system model in the form of a user-friendly application for managing e-waste. Java programming language was used to develop the application. This web-based management system will help the government to apply the developed e waste management policy more accurately. The web-based model will create a strong network among consumers, government and e waste recycling companies or e waste collectors. Thus, will be much easier for the government to manage e-waste systematically. This study includes developed a reverse logistic meta model for e-waste management of Bangladesh and proposed a web-based e-waste management system model in the form of a user-friendly application for managing e-waste, limitation of the study, recommendation and future work.

*Keywords:* E- waste management; Reverse logistic; Meta model; Web based model; Cell phone application.

## Authors' biographies

Dr. Mohammad Iqbal is currently serving as a Professor at Shahjalal University of Science and Technology (SUST), Sylhet-3114, Bangladesh under the Department of Industrial and Production. He is the founder lecturer of Department of Industrial and Production, SUST. He served as the Head of the dept. for 13 years. Dr. Iqbal was the Dean of School of Applied Sciences and Technology for two years. He was the Head of Petroleum and Mining Engineering Department, SUST for one year. Dr. Iqbal is actively involved in research and teaching of Mechanical, Industrial, Production Engineering and

environment related topics. He has 28 years of industrial, research and teaching experiences along with the working scopes in a development organization.

Faysol Siddique is an undergraduate student of the Department of Industrial and Production Engineering at Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh. His research interests include operations research, simulation, reliability, scheduling, manufacturing, and lean. At present Faysol Siddique is involved in a research project with Professor Dr. Mohammad Iqbal, Department of Industrial and Production Engineering at Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh.

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# Use of Smartphone Technology during COVID-19 Pandemic in Bangladesh

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## Abstract

Smartphone has affected almost all walk of human life since its invention by the scientist. The prominent areas, where impacts of Smartphone are obvious include business, education, health and social life. Mobile technology has drastically changed the cultural norms and behavior of individuals. The impacts from smartphone are both at the positive side and at the negative side. At one end, Smartphone enables people to create their own micro-cultures and engage into activities considered dangerous of society and on the other end; it enables people to remain connected all the time. The objective of this study is to focus on the use of smartphone technology during the current COVID-19 pandemic situation in Bangladesh. Due to its ubiquitous nature and social acceptance, the use of Smartphone can be seen in many applications such in educational institutions, hospitals, public places and shopping malls, etc. Continuous use of Smartphone technology has vast negative impacts of its users with respect to health concern. The study therefore investigates the impact of Smartphone in various applications areas such as business, education, health sectors, human psychology, social life, etc., in Bangladesh. The study also includes extended applications of Smartphone, its user's side effects, ergonomic impact and accompanied limitations, etc., during current COVID-19 pandemic situation in Bangladesh.

*Keywords:* Smartphone, COVID-19 pandemic, Health and ergonomics, Usability limitations, Social impact

## Authors' biographies

Dr. Mohammad Iqbal is currently serving as a Professor at Shahjalal University of Science and Technology (SUST), Sylhet-3114, Bangladesh under the Department of Industrial and Production. He served as the Head of the dept. for 13 years. Dr. Iqbal was the Dean of School of Applied Sciences and Technology for two years. He was the Head of Petroleum and Mining Engineering Department, SUST for one year. He served as a visiting research scholar at Texas A& M University, College Station, Texas, USA in 2018. Dr. Iqbal is actively involved in research and teaching of Mechanical, Industrial, Production Engineering and environment related topics. Dr. Iqbal has 28 years of industrial, research and teaching experiences. At present, Professor Iqbal is the Co-Chair of IEOM Society of Bangladesh Chapter and the president of Ergonomics Society of Bangladesh.

Shahrin Iqbal is an undergraduate student of the Department of Electrical and Electronics Engineering at Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh. Her research interests include Protonix, Health & safety, Robotics simulation. At present, Shahrin Iqbal is involved in a

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Ahm Shamsuzzoha has been working as an Associate Professor (Tenure track) at Digital Economy Research Platform, School of Technology and Innovations, University of Vaasa, Finland. He received his PhD in Industrial Management Unit (Department of Production) from the University of Vaasa, Finland and his Master of Science (Department of Mechanical Engineering) degree from the University of Strathclyde, Glasgow, UK. His major research and teaching interest lie in the area of supply chain management, enterprise collaborative networks, project management, product customization, and simulation modelling. He has published several research papers in both reputed international journals and conferences.

# Sustainable Management: A Review of the Practicesin the Real World and Implicationsfor Organizations with Resource Constraints

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## Abstract

We are living in the era of sustainable development goal 2030 (SDG). Individual, society, business, and national priorities are aligned within the broader framework of SDG. So, management of organizations, business and non-business alike are expected to follow the trend. All organizations and managers are concerned about how to make management more sustainable, at least normatively, as expected by multitude of stakeholders. Quite well before the SDG in action, the issue of environmentally and ecologically friendly organization and management had been there in practice, which we now call practice of 'sustainability', as a common term to communicate the same. But important change is that what was once a 'good to have' or 'should have', now has become part of the mainstream. Or in other words, organizations and management is under stakeholders' pressure to mainstream the idea of sustainability. This paper deals with that subject matter. The objective is to review the long established and ongoing best practices in the business world or organizational world in the sustainability domain. This review will lead to identify some patterns of practice for others to follow, from a practical point of view. Methodology will be a qualitative review of the practice oriented leading business journals like Harvard Business Review, scholarly pieces from popular media, and sources from leading consulting companies, which document the ongoing 'practice', rather than ongoing 'theories' as in 'academic' journals. These 'Practices' will be sorted and analyzed, to provide guidelines for others to follow. As a particular emphasis, the paper will attempt to identify 'more feasible and practical' framework relevant to resource constraint organizations located in emerging and developing countries, including Bangladesh.

*Keywords:* Sustainable Development, Management, Sustainability practice, Emerging and Developing countries.

## Authors' biographies

Dr. Moslehuddin Chowdhury Khaled is an associate professor in the Dept. of Management and HRM, and Director of Center for Entrepreneurship, Innovation, and Sustainable Development (EISD), in Chittagong Independent University, Bangladesh. Focused on qualitative approach, his research interests include Management in Government, SME and family business, organization design, and social enterprises.

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# Transboundary Small-Scale Fishery Governance in the Bay of Bengal – The Hilsa (Tenualosa ilisha) Fishery as a Case Study

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## Abstract

The management and governance of shared stocks have long been identified as a challenge to achieving long-term socio-economic and environmental sustainability in fisheries. Though transboundary resource governance (for example, concerning water and fish) has been studied in many parts of the world, this topic remains poorly understood within the Bay of Bengal region. Hilsa (Tenualosa Ilisha) is a transboundary fish that migrates across the Bay of Bengal? through the rivers of Bangladesh, India, and Myanmar. It is harvested in the Bay of Bengal by millions of fisherfolk from all three countries. A lack of active cooperation and collaboration between these states, however, often results in fishers from one country being criminalized by the governments of other countries for trespassing into their exclusive economic zones and not complying with their regulations. This situation raises issues of social equity and justice. Having no or inadequate provision for the management of transboundary fish stocks could lead to degradation of the species and the ecosystem, with severe impacts on the quality of life and economic growth prospects for the region. Therefore, focused research is needed to develop a shared transboundary management policy for hilsa fisheries to help build a more effective governance regime with balanced power sharing between the three countries that would enhance the well-being of fishers and the ecosystems they operate in. Towards this end, primary and secondary data will be collected through documentary analysis and literature review, and by conducting semi-structured interviews with fishers and other relevant stakeholders that operate in the region. This is data, in turn, is intended to facilitate the highly challenging process of negotiating and implementing transboundary fisheries management practices in the region. The most promising framework for these practices would appear to lie in adapting co-management arrangements that establish functional relationships between government authorities and local stakeholders – itself an important aspect of conflict resolution in the region.

*Keywords:* Transboundary governance, Hilsa, Bay of Bengal, co-management, sustainability.

## Author's biography

Mohammad Mozumder holds PhD, major in Biological and Environmental science, University of Helsinki, Finland. His PhD focused on the small-scale hilsa shad fishery of Bangladesh, intending to contribute valuable information to the global project of sustainable natural resource management. He is working as a researcher, Fisheries, and environmental management group, Faculty of Biological and Environmental Science, University of Helsinki, Finland. His research focuses on interdisciplinary approach in Fisheries management. He has published a couple of articles in national and international journals as the principal author and a co-author.

# Public acceptance of Arctic district heating system in Finland

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## Abstract

In Finland, district heating system provides many advantages for peoples' everyday life. However, public acceptance is one of the major challenges to introduce renewable based district heating system in Finnish Arctic areas. This paper examines public acceptance in terms of public's opinion, awareness, knowledge about renewable based district heating system by designing a multiple-choice questionnaire with four groups of questions: background information, community perspective, social perspective, and individual perspective. Study indicates that more than 60% of total respondents were willing to invest extra cost to obtain renewable based district heating services; 50% of them would prefer tax support. The answers showed that the long-term economic feasibility of using renewable based in home was not obvious to 31.05% of the total respondents. Half of the study respondents believe that energy poverty is in higher level in rural areas, but sustainable heating technologies could be more economic than traditional heat sources. Findings of this paper have important policy implications related to public acceptance of Arctic district heating system in Finland.

*Keywords:* District heating system, public acceptance, economic feasibility.

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# International Opportunity Development for Small and Medium Industries of Developing Countries: A Network Model

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## Abstract

Business is meant for exploiting opportunities with the given resources for making profit. In today's digital world, any business can exploit markets of everywhere with the help of network. The network theory states that organizations of any kind do not follow the step-by-step process for making itself international; rather, the organizations become internationalized with the help of network partners. We know that networking is the backbone for developing and functioning of the relationship among enterprises working in native and foreign countries for doing business by which firms develop interdependent relationships for achieving resources, capabilities, special quality and new business opportunities. The small and medium enterprises of developing countries may use a network model for searching international opportunities. But the question is that is there any suitable network model for them or do they need any special network model for effective international opportunity development? This query is addressed here. The aim of the study is to design a network model for international opportunity development for the small and medium enterprises of developing countries. It further assessed the nature and consequences of that network model for searching such international opportunities for small and medium enterprises of developing countries. The model will help policy makers to develop support services for such enterprises to exploit opportunities for the benefit of them as well as for the country.

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# Carbon stocks of homestead forests have a mitigation potential to climate change: A case from Chittagong Hill Tracts, Bangladesh

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## Abstract

Homestead forests of Bangladesh (0.27 million ha land) have potential of providing co-benefits of conserving biodiversity and storing carbon (C). The study aimed to estimate C stocks and how stand structure affects the tree biomass C in homestead forests of the Chittagong Hill Tracts (CHT), Bangladesh. A total of 176 homestead forests at three altitudes in the CHT were randomly surveyed. All woody vegetations were measured, and litter and soil (0–30 cm depth) were sampled. The results show that the above- and below- ground tree biomass C stock in the top two altitude forests was up to 37–48% higher than in low altitude, due to significantly higher tree density and species diversity. An increase in species diversity index by one unit increased the biomass stock by 23 Mg C $ha^{-1}$. The C stock of litterfall in low altitude forests was 22–28% higher than in the top two altitude owing to the deposition of litters downslope by gravity and deliberate use of pruned materials as mulch for soil improvement and conservation, resulting in up to 5% higher total soil C. The topsoil C was 10–25% higher than the deeper soil, depending on the altitude. The forest stored a total of 71 tree species and 89 Mg C $ha^{-1}$, which can contribute to climate change mitigation while conserving biodiversity, moisture, and hill soil in small-scale forests. This study would help policymakers to strengthen the recognition of small-scale forests for mitigation in REDD+ (reducing emissions from deforestation and forest degradation, the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks) by generating C credits for owners from sustainably managed forests.

*Keywords:* Tree biomass, Biodiversity, Litterfall, REDD, Soil carbon

## Authors' biography

Tarit Kumar Baul is working in the Institute of Forestry and Environmental Sciences, University of Chittagong, Bangladesh. He holds a Doctoral Degree in Forestry from the University of Eastern Finland, with MSc in Agroforestry (Bangor University, UK), MSc in Agri. Dev. (Copenhagen University, Denmark), and MSc and BSc in Forestry (University of Chittagong, Bangladesh). The main research focus is on the climate impacts of carbon sequestration and material substitution by forest biomass, with implications on the management of forests, agroforests, tree outside forests (TOF). This includes forest ecosystem- and techno-carbon, LCA, and substitution impacts analyses. His research is also focused on the domestication of rare tree species and agroforestry, management of biodiversity, with emphasis on conservation and utilization issues, forests-people-climate interaction, with emphasis on indigenous knowledge.

# Governance of Social Safety Net Programs, responding to Emergencies in Bangladesh

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## Abstract

Social Safety Net Programs (SSNP) in any given setting have been in place to realize twin objective of protecting vulnerable citizens from falling to poverty beyond a certain level through redistribution and coping with natural calamities. In Bangladesh SSNPs are the services the successive governments have been delivering for decades in different forms. These SSNPs are of different types including Cash grants, food supplies and other forms of targeted benefits. These SSNPs are usually sponsored by different line ministries through their nation building departments at sub-national level. However, Union Parishads, the lowest tier of local government bodies in Bangladesh are made responsible for making these distribute to the target beneficiaries by making list according to the SSNP specific selection criteria.

Needless to say, in Bangladesh long-term SSNPs are being delivered by a range of ministries, including the Ministry of Social Welfare, Ministry of Primary and Mass Education, and Ministry of Women and Children's Affairs. The SSNPs of emergency type are being delivered by the Ministry of Disaster Management and Relief and some of the SSNPs that involve food transfers are usually led by the Ministry of Food.

For governance and coordination, the GOB under its National Social Security Strategy (NSSS) has introduced a cluster approach across the implementing ministries. The five thematic clusters are - social allowance, food security and disaster assistance, social insurance, labor/livelihood interventions, and human development and social empowerment. The Cabinet Secretary headed Central Management Committee, an inter-ministerial body responsible for overseeing functions of these clusters who are supposed to meet quarterly. Besides the ministry initiatives, the PM's cash support scheme during COVID pandemic was conceptualized and implemented by the PM's office with extended support from the MoDMR, the ICT Division, and the Finance Division. While the PM's initiative was aimed at addressing the emergency issues of the households affected by COVID pandemic due to loss of job or livelihoods, the modified guidelines limited its scope by stating that those families already receiving any of the existing SSNP benefits i.e. OMS, FFP, VGD, and/or VGF (for fishermen) would not be eligible for the COVID 19 humanitarian support program.

With all attempts on part of the government a CPD study in 2020 revealed that around 65.6 per cent of the country's households that receive financial assistance under the government's SSNPs were ineligible for the scheme as they belong to the non-poor category. The same study and some other studies also identified inefficiency in beneficiary selection due to political consideration and nepotism. The rate of inefficiency was hire where the benefits were for longer period of time as mentioned in those studies.

GOB has initiated some of the good initiatives to harmonize SSNPs beneficiary listing and overcoming the inherent weakness in the process by taking advantage of the National Household Database (NHD) of the Bureau of Statistics, digitalized Beneficiary registries by ministries concerned, SPBMU MIS by the Finance Division and National ID Database

maintained by the Election Commission of Bangladesh. The benefits of these initiatives are yet to be materialized due primarily delay of the functionality of those in the ground. The paper was an attempt to identity the gaps and lapses in beneficiary selection and how better governance of SSNPs would ensure the best possible outcomes for vulnerable and deserving people in realizing the intent of such programs.

*Key words:* Governance, Coordination, SSNP, Emergency, GOB

**Author's biography**

AKM Saifullah is an independent development researcher based in Dhaka, Bangladesh. He received his PhD in Administrative Science from University of Tampere, Finland in 2002.

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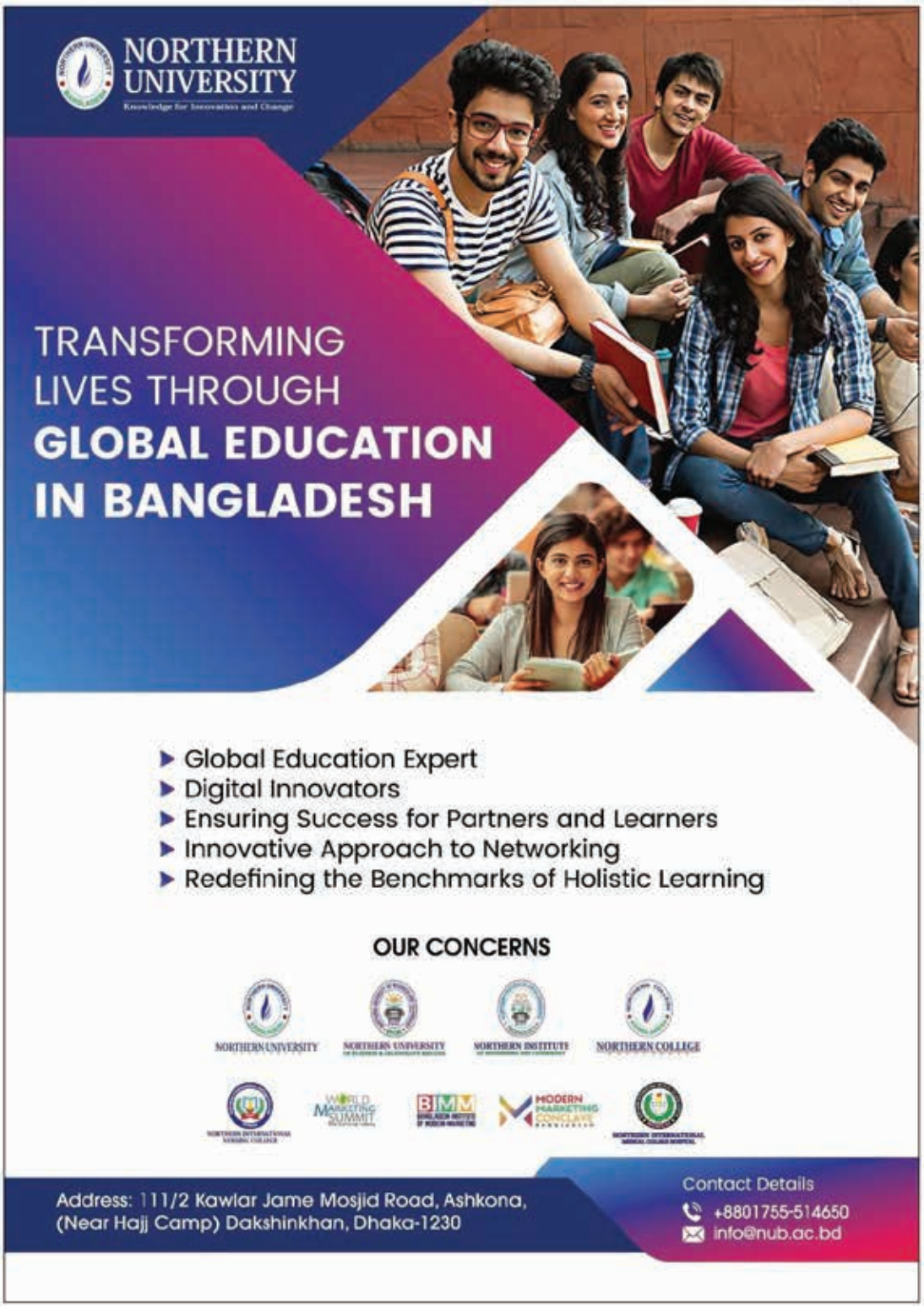

BDPF publication series 2022



https://bdpf.net

ISBN 978-952-94-6948-2 (softcover)
ISBN 978-952-94-6949-9 (PDF)
BDPF Y-tunnus: 3117032–8

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