Global Technopreneur University 2030

UTHM Universiti Tun Hussein Onn Malaysia

RESILIENT BUILT ENVIRONMENT

THE ROLES OF FACILITIES MANAGEMENT

3rd Facility Management ASIA Conference 2022

13-14 December 2022, Le Meridien, Kota Kinabalu, Sabah

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KANZU RESEARCH | RESILIENT BUILT ENVIRONMENT

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Director of Kanzu Research: Resilient Built environment

Universiti Tun Hussein Onn Malaysia (UTHM)

Speaker Information

Name: SR. DR. NORALFISHAH SULAIMAN

Education: BSC. REAL ESTATE MANAGEMENT (HONS). MSC. FACILITIES MANAGEMENT (DISTINCTION).
PHD IN BUILT ENVIRONMENT (SALFORD, UK).

Position:

ASSOCIATE PROFESSOR
DEPT OF ARCHITECTURE, FACULTY OF CIVIL ENGINEERING & BUILT ENVIRONMENT, UTHM (2022-PRESENT).
SENIOR LECTURER
DEPT OF REAL ESTATE, FACULTY OF TECHNOLOGY MANAGEMENT, UTHM (2011-2022).
DIRECTOR
KANZU RESEARCH: RESILIENT BUILT ENVIRONMENT, UTHM (2014-PRESENT).
MANAGING DIRECTOR
KANZU KNOWLEDGE: CONNECTING WISDOM, UTHM (2018-PRESENT).
DIRECTOR
KANZU ACADEMY CO.- resilient built environment training centre@UTHM (2022-present).
DIRECTOR
SUSTAINABLE CAMPUS OFFICE (SCO), UTHM (2016-2021).
DIRECTOR
CENTRE OF EXCELLENCE FOR FACILITIES MANAGEMENT (CEFM), UTHM (2013-2015)-Co Founder
SECRETARY GENERAL
Malaysian association of facilities Management (MAFM), UTHM (2003-2004)-Co Founder.

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Research Interest:
REAL ESTATE MANAGEMENT, ISLAMIC REAL ESTATE, FACILITIES MANAGEMENT, STRATEGIC FACILITIES MANAGEMENT, DISASTER & RISK MANAGEMENT, SOCIAL CARE FACILITIES MANAGEMENT, HEALTHCARE FACILITIES MANAGEMENT, SUSTAINABILITY & SUSTAINABLE DEVELOPMENT, DIGITALIZATION AND BUILT ENVIRONMENT & RESILIENT & AGILE CITIES FOR FUTURE.

Professional Membership:
OXFORD REAL ESTATE SOCIETY (OXRES)
EUROPEAN NETWORK FOR HOUSING RESEARCH (ENHR)
ROYAL INSTITUTION OF SURVEYORS MALAYSIA (RISM)

Speaker Information

KANZU RESEARCH | RESILIENT BUILT ENVIRONMENT

Premium Projects: MYR20 million in total

(1) BRITISH COUNCIL-NEWTON FUND INSTITUTIONAL LINKS (2014) GBP 140,207.00
Climate Impacts in Malaysia: Attenuation Through an Integrated Safer built Environment (CLIMATISE).
(2) GLOBAL CHALLENGE RESEARCH FUND (GCRF) ENGINEERING PHYSICAL SCIENCE RESEARCH COUNCIL (EPSRC), UK (2017) GBP1.2 MIL.
A Collaborative Multi-Agency Platform for Building Resilient Communities (MOBILISE).
(3) PROCTER & GAMBLE (P&G), USA (2019) MYR 1 MIL
Center for Sustainable Small Owners (P&G-CSS) with Malaysia Institute of Supply Chain Innovation (MISI).
(4) GCRF- ECONOMIC SCIENCE RESEARCH COUNCIL (ESRC) GBP 1 MIL
Technology Enhanced Stakeholder Collaboration for Supporting Risk Sensitive Sustainable Urban Development (TRANSCEND).
(5) ARCHIBUS EDUCATIONAL GRANT, USA MYR 4 MIL
ARCHIBUS software licenses for urban facilities management system.
(6) DEVELOPMENT OF two living labs, **"RESILIENCE4WRD: Resilient & Agile Cities for Future"**, in Sarawak and UTHM, Johor.

Teaching Subjects:

STRATEGIC FACILITIES MANAGEMENT-**BPF32703**
FACILITIES MANAGEMENT-**BPE42003**
RISK MANAGEMENT-**BPF32403**
REAL ESTATE INFORMATION TECHNOLOGY-**BPE 24703**
COMPUTER APPLICATION IN REAL ESTATE-**BPE24703**
REAL ESTATE MARKET ANALYSIS-**BPE34103**
DISASTER MANAGEMENT -**BPF43003**
INTERNATIONAL REAL ESTATE -**BPF42603**

MoU/MoA/LoI:

Sarawak Multimedia Authority (SMA), Sarawak digital economy corporation (SDEC), RS & GIS Consultancy Sdn Bhd; Construction Research Institute of Malaysia (CREAM); Favoriot Sdn Bhd; Futurise Sdn Bhd, KANZU Knowledge Consultant, University of Salford, Greater Manchester, UK, Universiti Teknologi MARA (UiTM); Microcorp Sdn Bhd; MNJ Teras Sdn Bhd; ARCHIBUS Inc, USA and many more.

The Beginning of FM in Malaysia

In **1983** **Professor Franklin Becker** introduced the first **BSc and MSc degree programs** in FM at the **Cornell University**, Ithaca, New York.

EUROFM EUROPEAN FACILITY MANAGEMENT NETWORK
RESEARCH · BUSINESS · EDUCATION

Since 1993 in the Europe, Several countries also founded a **Centre for FM or developed a faculty for FM at universities**.

University of Strathclyde Glasgow

Centre for facilities management (CFM) produced FM working paper in 1993, for FM case study at the Prince Phillip Hospital

In 1999, The first **FM Masters (MSc)** programme was introduced in Malaysia at the University Technology Malaysia (UTM) by Prof Maziah Ismail, Faculty of Engineering & Geoinformation.

The Beginning of FM in Malaysia

1999 > The first **FM Masters** programme was introduced in Malaysia by the University Technology Malaysia (UTM);

2001 > The first conference in FM was organised by UTM. The theme was *"FM-KL. Where are We Heading ?"*. This was the **first step** of the FM programme held at international level in Malaysia;

2002 > The awareness of the importance of FM then created the launch of the next FM academic programme in **2002**, by the Universiti Teknologi MARA (UiTM) at the Shah Alam Campus;

2004 > **UTHM** has been moving forward by initiating the development of the **Malaysian Association of Facilities Managers (MAFM)** by the Department of Construction and Property Management;

The Beginning of FM in Malaysia

2004 > The establishment of the **Centre of Excellence for Facilities Management (CEFM)** was made by the same department. Together with CEFM, MAFM (2004) recognised **21 Groups** of FM businesses in its constitution;

University | centre of excellence | association

The Beginning of FM in Malaysia

2007 > FM is becoming more needed in Malaysia, the first inaugural **National Asset and Facility Management Convention** (NAFAM) was jointly held by **Public Works Department Malaysia (PWD)** together with **Advanced Maintenance Precision Management Sdn. Bhd. (AMPM)** at the Putra World Trade Centre (PWTC) Kuala Lumpur;

NAFAM National Asset And Facility Management

2009 > NAFAM 2009 was launched. Officiated and closed by YABhg Tun Abdullah bin Haji Ahmad Badawi (Prime Minister). The main agenda was to explore **innovative ideas** for an effective engagement of **Total Asset Management** in the 10th Malaysia Plan. MAFM moved to Kuala Lumpur as a professional association;

JKR

Present > Many initiatives being taken by academic institutions and private entities to engage with FM practice over time. FM courses have been introduced at **many other public & private institutions** such as Lim Kong Wing University; Infrastructure University of Kuala Lumpur; Open University Malaysia; KLIA Professional Management College; Etrain College etc.

UTM Universiti Teknologi Malaysia

UTHM Universiti Tun Hussein Onn Malaysia

Many FM companies also **started to emerge** in Malaysia. These players have helped **to shape the way FM practice evolves**. FM is gaining status as an important profession in providing a wide range of facility management services to the public sector organisation indeed.

Universiti Teknologi MARA

MSc & PhD (by research) programs are offered by many public & private university such as in UM, UITM, UTM, UTHM, OUM etc.

Open University Universiti Terbuka Malaysia

Int FM Association (IFMA)

IFMA®

International Facility Management Association

- **VISION:** Lead the future of the built environment to **make the world a better place.**
- **MISSION: We advance our collective** knowledge, value and growth for Facility Management professionals to perform at the highest level.
- Founded in 1980, IFMA is the **world's largest & most widely recognized association** for facility management professionals, supporting over **20,000** members in more than **100 countries**.
- Defined FM as "a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating **PEOPLE**, **PLACE**, **PROCESS** + **TECHNOLOGY**". Facility according to IFMA is "something that is built, installed or established to **serve a purpose**" (IFMA, 2011).
- Accredited degree program globally through IFMA Foundation.

IFMA™ International Facility Management Association

IFMA™ Health Care Council International Facility Management Association

IFMA FOUNDATION WWW.IFMAFOUNDATION.ORG EDUCATION • RESEARCH • SCHOLARSHIPS

FMG FACILITY MANAGEMENT GRADUATE Accredited FM Degree IFMA

ABET Applied and Natural Science Accreditation Commission

Int FM Association (IFMA)

"a profession that encompasses **multiple disciplines** to ensure functionality of the built environment by integrating **PEOPLE**, **PLACE**, **PROCESS** + **TECHNOLOGY**". Facility according to IFMA is "something that is built, installed or established to **serve a purpose**" (IFMA, 2011).

IFMA **formed councils** to meet the industry-specific networking & information needs of its members. Truly global in nature, councils are not limited by geographic boundaries. Members are able to communicate with colleagues worldwide about issues, concerns & best practices specific to your area of facility management.

afc
Academic Facilities council

airfc
Airport Facilities council

BICUC
Banking Institutions & Credit Union Council

City & Country Club Council of IFMA
City & Country Club Council

CORPORATE FACILITIES COUNCIL
HEADQUARTERS | CAMPUSES | OFFICE ENVIRONMENTS
Corporate facilities Council

fmcc
FM Consultant Council

IFMA Health Care Council
International Facility Management Association
Health care Council

IFMA Hospitality Council
International Facility Management Association
Hospitality Council

lic
Legal Industry council

mcic
Museum & Cultural Institution council

IFMA Nonprofit Facilities Council
International Facility Management Association
Nonprofit Facilities council

psc
Public Sector Facilities council

rdc
Research & Development Facilities council

IFMA Retail Council
International Facility Management Association
Retail Facilities council

UTILITIES COUNCIL OF IFMA
Utilities council

British Institute of Facilities Management (BIFM)

BIFM®

ADVANCING OUR PROFESSION

professional body for facilities management (FM) in the UK. Founded in 1993, promotes excellence in FM for the benefit of practitioners, the economy & society. Supporting & representing over 16,000 members around the world, both individual FM professionals & organisations & thousands more through qualifications & training. We promote and embed professional standards in FM.

EUROPE'S largest professional body for FM.

"an integration of processes within an organisation to maintain + develop the agreed services which support + improve the effectiveness of its primary activities"

(BIFM, 2013)

Foreword

Professional development to transform your career and your business

Getting ahead in the current economic climate is more challenging than ever. Whether you want to develop your skills in your current role or work towards a new position, professional qualifications can add considerable value to your skill and knowledge base. With expertise at a premium in this environment, as employers seek ever more efficient ways to meet their objectives, make sure you have the tools to deliver.

L A Hausmanis

Linda Hausmanis
Head of Awarding Organisation
British Institute of
Facilities Management

British Institute of Facilities Management (BIFM)

FM roles can cover management of **a wide range of areas** including **health & safety**, **risk management**, **business continuity**, **procurement**, **sustainability**, **space planning**, **energy**, **property** & **asset management**. They are **typically responsible** for activities such as **catering**, **cleaning**, **building maintenance**, **environmental services**, **security** and **reception**.

Bifm qualification handbook (2014)

British Institute of Facilities Management (BIFM)

Large + complex sector comprising **a mix of in-house departments**, specialist contractors, large multi-service companies, and consortia delivering the full range of design, build, finance + management.

Continues to expand to include the management of an increasingly **broad range of tangible assets**, **support services + people skills**.

Institute of Workplace & Facilities Management (IWFM)

iwfm
Institute of Workplace and Facilities Management

- The Institute of Workplace and Facilities Management (IWFM) is the **body for workplace and facilities professionals**.
- promote excellence among **a worldwide community** of over 17,000 and to demonstrate the **value & contribution of workplace & facilities management** more widely.

2018 est.

The IWFM was established in 2018. It builds on the proud heritage of 25 years as the British Institute of Facilities Management (BIFM).

BIFM
ADVANCING OUR PROFESSION

Our mission

We empower professionals to upskill and reach their potential for a rewarding, impactful career. We do this by advancing professional standards, offering guidance and training, developing new insights and sharing best practice.

Our vision

As the pioneering workplace and facilities management body, our vision is to drive change for the future. To be the trusted voice of a distinct profession recognised, beyond the built environment, for its ability to enable people to transform organisations and their performance.

Why Workplace ?

iwfm
Institute of Workplace and Facilities Management

WHAT DO WE MEAN BY WORKPLACE?

Workplace recognises the **joint responsibility** of facilities management, information technology and human resources to achieve optimal productivity between people, technology & workplaces. Not working space limited to “office” but anywhere that work happens. It captures a broader world, considering space, technology & culture. It recognises a need for skilled individuals Who can interconnect between these specialisms.

(Iwfm Handbook, 2018)

IS THIS A WORKPLACE?

recognises the **joint responsibility** **of facilities management**, **information technology** **&** **human resources.** Achieve optimal productivity between people, technology & workplaces. anywhere that work happens. captures a broader world, considering space, technology & culture. It recognises a need for skilled individuals Who can interconnect between these specialisms.

FM in Malaysia

"The total management that integrates all services to support the core business of organization…"

FM in Malaysia

TAKRIF KERJA PEMBINAAN MENGIKUT AKTA 520 (PINDAAN 2011)

Kerja-kerja pembinaan adalah pembinaan, penyambungan, pemasangan, pembaikan, penyenggaraan, pembaharuan, pemindahan, pengubahsuaian, pengubahan, perombakan atau perobohan:-

a) mana-mana bangunan, binaan, bangunan besar, struktur, dinding, pagar atau cerobong, sama ada dibina keseluruhannya atau sebahagiannya di atas atau di bawah paras bumi;
b) mana-mana jalan, pelabuhan, landasan keretapi, talian kabel, terusan atau padang terbang
c) apa-apa kerja saliran, pengairan atau kawalan sungai
d) apa-apa kerja elektrik, mekanikal, air, gas, petrokimia atau telekomunikasi
e) mana-mana kerja jambatan, empangan kerja tanah, talian paip, terowong atau kerja penebusgunaan.

Dan termasuklah-

A) apa-apa kerja yang membentuk bahagian yang penting dan integral atau adalah persediaan atau sementara bagi kerja-kerja yang diperihalkan dalam perenggan (a) hingga (e), termasuk pembersihan tapak, penyelididkan dan pembaikan tanah, pemindahan tanah, penggalian, peletakan batu asas, pemulihan dan landskap tapak; atau
B) pemerolehan bahan binaan, kelengkapan atau pekerja, yang semestinya diperlukan dalam perenggan (a) hingga (e).

DEFINISI KERJA FASILITI

Aktiviti perkhidmatan fasiliti dan penyenggaraan bangunan / infrastruktur secara bersepadu yang meliputi perkhidmatan kejuruteraan dan perkhidmatan yang berkaitan dengan keperluan pengguna.

DEFINISI FASILITI

Segala bentuk bangunan / infrastruktur dan kemudahan berkaitan untuk keperluan pengguna.

KATEGORI DAN PENGKHUSUSAN KONTRAKTOR FASILITI

Aktiviti perkhidmatan fasiliti dan penyenggaraan bangunan / infrastruktur secara bersepadu yang meliputi perkhidmatan kejuruteraan dan perkhidmatan yang berkaitan dengan keperluan pengguna.

KATEGORI	PENGKHUSUSAN
F Fasiliti *(Facility)*	F01 Fasiliti Bangunan dan Infrastruktur Am *(General Building and Infrastructure Facilities)*
	F02 Fasiliti Bangunan Penjagaan Kesihatan *(Healthcare Facilities)*

KOD DAN PENGKHUSUSAN FASILITI

KOD	PENGKHUSUSAN	KETERANGAN
F01	FASILITI BANGUNAN DAN INFRASTRUKTUR AM	Aktiviti perkhidmatan fasiliti dan penyenggaraan bangunan/ infrastruktur secara bersepadu yang meliputi perkhidmatan kejuruteraan dan perkhidmatan yang berkaitan dengan keperluan pengguna
F02	FASILITI BANGUNAN PENJAGAAN KESIHATAN	Aktiviti perkhidmatan fasiliti dan penyenggaraan bangunan/ infrastruktur secara bersepadu yang meliputi perkhidmatan kejuruteraan, kejuruteraan biomedical dan perkhidmatan yang berkaitan dengan keperluan pengguna

SYARAT – SYARAT AM PENDAFTARAN KONTRAKTOR FASILITI

1. Berdaftar dengan Suruhanjaya Syarikat Malaysia (SSM) dalam Syarikat Sdn. Bhd. atau Berhad / Suruhanjaya Koperasi Malaysia (SKM) dalam Koperasi Berhad / Jabatan Pendaftaran Pertubuhan Malaysia (ROS) dalam Pertubuhan.

2. Jenis Perniagaan yang didaftarkan hendaklah meliputi kerja - kerja pembinaan dan / atau yang berkaitan dengan fasiliti dan penyenggaraan.

3. Mempunyai modal berbayar yang ditetapkan

4. Pengarah mempunyai Sijil Kecekapan Pengurusan (SKP) dalam bidang Perkhidmatan Fasiliti dan Penyenggaraan ATAU mempunyai kelayakan yang diiktiraf oleh CIDB seperti berikut :
   - Certified Facility Manager (CFM) –IFMA
   - Facility Management Professional (FMP) – IFMA
   - Certified British Institute of Facilities Management (CBIFM) – BIFM
   - Ijazah sarjana muda / Sarjana / Doktor Falsafah yang diiktiraf oleh kerajaan dalam bidang pengurusan aset / fasiliti /penyenggaraan dengan tiga (3) tahun pengalaman kerja yang berkaitan.

5. Personel Teknikal memiliki kelayakan yang ditetapkan.
   - Sijil Kecekapan Kemahiran (SKK)) dalam perkhidmatan fasiliti dan atau penyenggaraan
   - Berpengalaman dalam perkhidmatan fasiliti dan atau penyenggaraan

Board of Valuers, Appraisers & Estate Agents Malaysia

In Malaysia, **The Board of Valuers, Appraisers and Estate Agents Malaysia** (BOVAEA)was set up in 1981 under the purview of the Ministry of Finance, Malaysia. The setup and operation of this Board is governed by the provision of Valuers, Appraisers and Estate Agents Act 1981. Its primary function is to regulate the Valuers, Appraisers and Estate Agents practising in Malaysia.

(1) Valuation of Landed Properties
(2) Rating/Local Taxation
(3) Property Management
(4) Real Estate Agency (Sales, Lettings, Purchase of Land + Buildings)
(5) Compulsory Land Acquisition and Compensation
(6) National Taxation
(7) Property Development and Investment
(8) Property Consultancy and Research

Royal Institute of Surveyors Malaysia (RISM)

Royal Institution of Surveyors Malaysia (RISM) is the professional institution representing the surveying profession in Malaysia and consists of four main divisions, namely:

(1) Building Surveying Division (BS)
(2) Geomatic and Land Surveying Division (GLS)
(3) Property Management, Valuation & Estate Agency Surveying Division (PMVS)
(4) Quantity Surveying Division (QS)

List of competency requirements of the Facilities Management APC pathway.
They are called 'Chartered Facilities Management Surveyor'

1. Strategic Facilities Management

strategic FM represents **higher order activities** involved in the alignment of facilities with corporate goals. This includes a measure of anticipation & forward planning & demands access to boardroom-level discussions and/or effective communication between senior personnel.

Then and Akhlaghi (1992) and Langston & Lauge-Kristensen (2002)

2. Management (Tactical) Facilities Management

monitoring & management of facility performance. They differ from strategies activities in that the direct link to corporate goal is absent, although the overall objective of:

(1) improving quality
(2) Reducing cost and
(3) Minimising risk remains"

RICS (2018)

2. Management (Tactical) Facilities Management

3 main features of **cost measurement**:

Economy

the procurement of goods & services at the best available price per unit

Efficiency

the use of the least quantity of resources to achieve the required output

Effectiveness

the achievement of the required outcome at the lowest total cost.

Often, facility managers & their support teams, including procurement & finance functions, focus on economic buying & efficient resource usage without reference to the related outcomes. Such an approach presents FM as a cost centre rather than a contributor to organizational success. Facility managers should avoid this perception by adopting a focus on effectiveness of the service.

2. Management (Tactical) Facilities Management

When planning actions to respond to identified risks, facility managers should establish a Risk Register. they should assess and document:

1) the likelihood of an occurrence of an identified risk
2) the likely impact of an occurrence
3) options for actions to prevent or reduce the likelihood of an occurrence
4) options to reduce the impact of an occurrence (i.e. mitigation) &
5) the degree of acceptability of any residual risk.

3. Operational Facilities Management

On a day to day level, effective FM provides a safe & efficient working environment, which is essential to the performance of any business whatever its size & scope" (BIFM,2011)

"Activities are more routine & are often viewed as custodial. For example, day to day operation at the hospital such as ward management, schedule of meals, recreational activities, recording complaints, service user plan etc. They differ from tactical activities in that they do not involve analysis & judgement, but nevertheless are essential to the proper functioning of infrastructure which has obvious ramifications for business productivity…"

Public Sector FM

What distinguishes **Public Sector Organisation (PSO)** from a private or voluntary organisation is PSO FM organisation has an element of **social mission** that drive its **governance strategy.**

PSO FM involves a complex structure of organisation that requires many **sectoral states** in order to deliver the services needed by the public.

Aim to ***"Do less, better"*** with an improved **focus** centering on the perceived ***"Core business"*** of the organisation.

Built Environment

The built environment includes man-made buildings & infrastructure stocks that constitute the physical, natural, economic, social & cultural capital. Urban fabric is a complex socio-technical system that encompasses different scales buildings, building stocks, neighbourhoods, cities & regions –each with different time constants, actors & institutional regimes.

-Hassler & Kohler, 2014-

Built Environment

The term 'built environment' has also been adapted to address the relation between the built & the 'unbuilt' part of the environment. This corresponds to the definition of a social ecological system where the 'built environment' can be considered as an artefact in an overlapping zone between culture & nature, with causation occurring in both directions.

-Hassler & Kohler, 2014-

Resilient

The word **"resilience"** come from the Latin word **"resilire"** means to **spring back**…

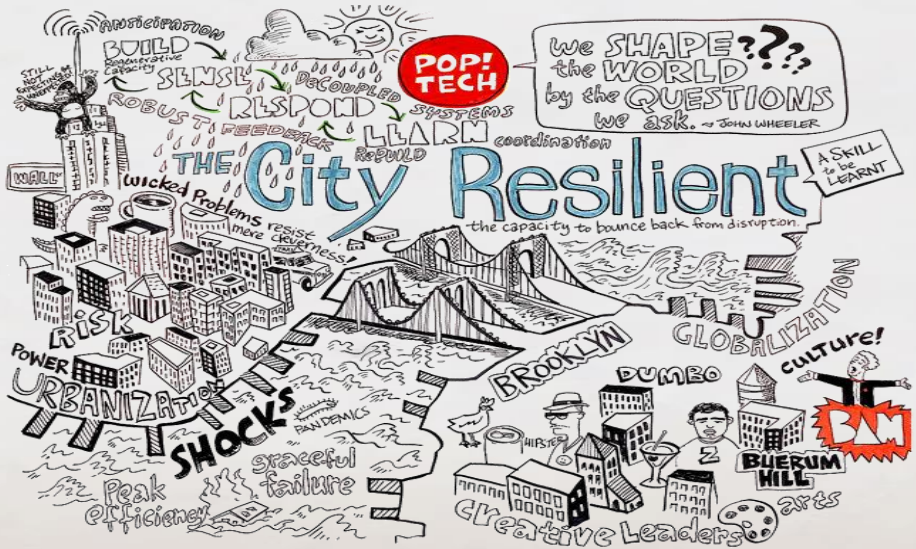
-Davoudi et al., 2012-

"A **resilient city** can adapt to a variety of changing conditions & withstand shocks while still providing essential services to its residents."

-World Bank-

urban resilience as "the capacity of individuals, communities, institutions, businesses, & systems within a city to survive, adapt, & grow no matter what kinds of chronic stresses & acute shocks they experience...even transform when condition require it.."

-100rC, Rockefeller Foundation-



Resilient Built Environment

offers a means to address the long-term evolution of the built environment & to explore implications of changing conditions on the efficacy of different approaches to planning, design, operation, management, value & governance.

The built environment as a set of different capitals (natural, physical, economic, social & cultural).

Resilience is situated in relation to a long term-oriented concepts of continuity, stability & equilibrium, duration & durability, robustness & vulnerability, fast & slow moving risks

-Hassler & Kohler, 2014-

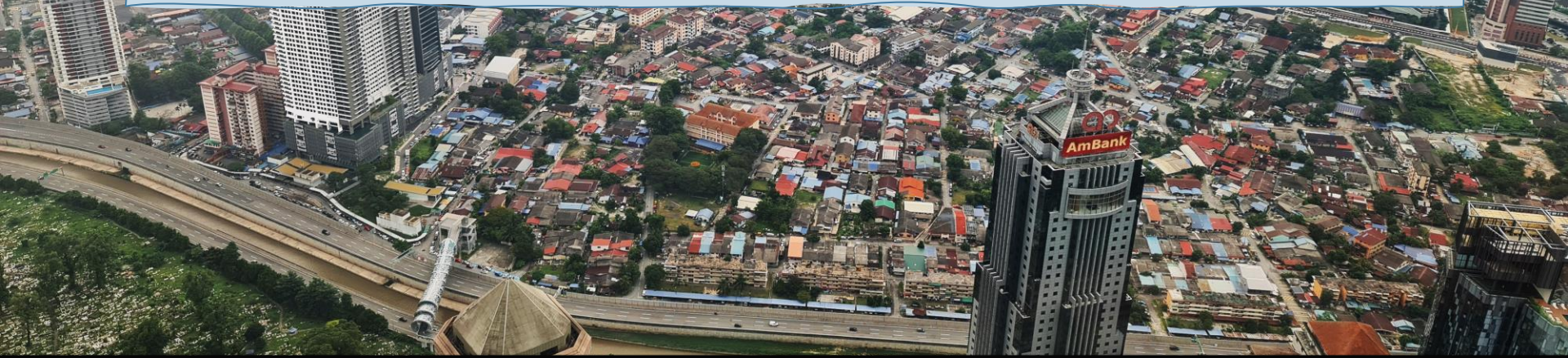
Resilient Built Environment

Resilience is about anticipating, planning & reducing disaster risk to effectively protect persons, communities & countries, their livelihoods, health, cultural heritage, socio-economic assets & ecosystems. The ideas of 'bounce back', 'spring forward' and 'build back better' are often used in the context of resilience.

Urban Resilience

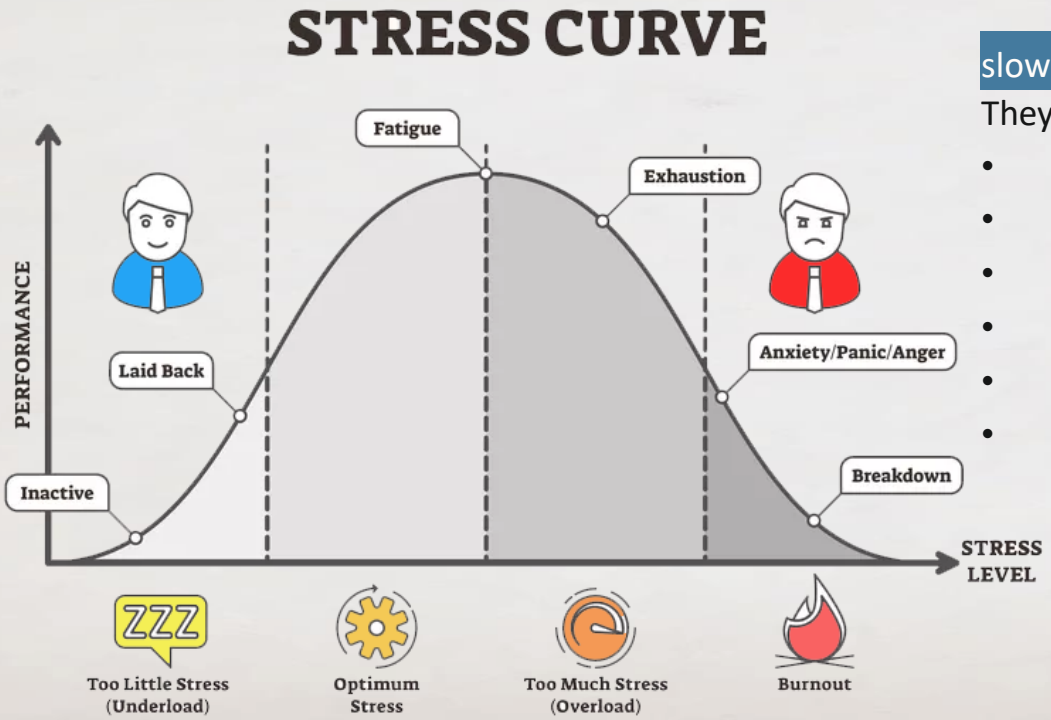
"The ability of a system, community or society exposed to risks (hazards) to resist, absorb, accommodate to & recover from the effects of a hazard in a timely & efficient manner, including through the preservation & restoration of its essential basic structures & functions".

- United Nations Office for Disaster Risk Reduction (UNISDR) 2009 -



Challenges: Stress & Shocks

(1) Chronic Stresses



slow-moving disasters that weaken the fabric of a city. They include:

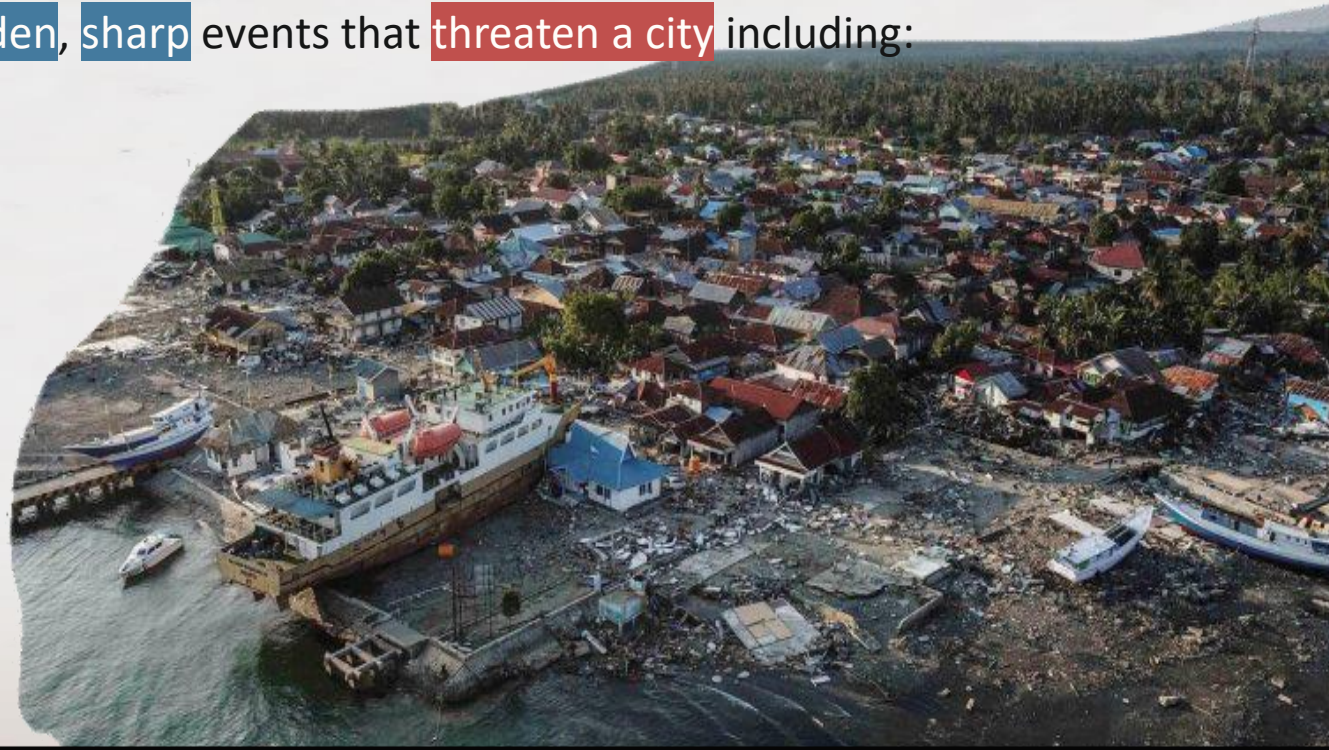
- High unemployment
- Overtaxed or inefficient public transportation system
- Endemic violence
- Chronic food shortages
- water shortages
- Many more….

Challenges: Stress & Shocks

(2) ACUTE SHOCKs

acute shocks are sudden, sharp events that threaten a city including:

- Earthquake
- Floods
- Disease outbreaks
- Tsunami
- bombing
- Terrorist attacks
- Many more…



Resilient City Challenges

NO	CHALLENGES	NO	CHALLENGES
1	Aging Infrastructure	26	Lack of Affordable Housing
2	Blizzard	27	Lack of Social Cohesion
3	Chronic Energy Shortages	28	Landslide
4	Coastal Flooding	29	Overpopulation
5	Commodity Price Fluctuations	30	Overtaxed/ Under Developed/ Unreliable Transportation System
6	Cyber Attack	31	Political Instability
7	Declining or Aging Population	32	Pollution or Environmental Degradation
8	Depletion of Natural Resources	33	Poor Air Quality/ Pollution
9	Disease Outbreak	34	Poor Health Infrastructure
10	Drought	35	Poor Transportation System
11	Earthquake	36	Pronounced Poverty
12	Economic Inequality	37	Rainfall Flooding
13	Economic Shifts	38	Rapid Growth
14	Economic Crime and Violence	39	Refugees
15	Epidemic of Drug and Alcohol Abuse	40	Resources Scarcity
16	Food Shortage	41	Riot or Civil Unrest
17	Hazardous Materials Accident	42	Rising Sea Level and Coastal Erosion
18	Heat Wave	43	Social Inequity
19	High Unemployment	44	Terrorism
20	Hurricane, Typhoon, Cyclone	45	Tropical Storms
21	Inequality	46	Tsunami
22	Infrastructure Failure	47	Volcanic Activity
23	Insufficient Educational Infrastructure	48	Water Management Issues
24	Intractable Homelessness	49	Wildfires
25	Invasive Species		

RESILIENT CITIES RESEARCH

Qualities of Resilient Systems

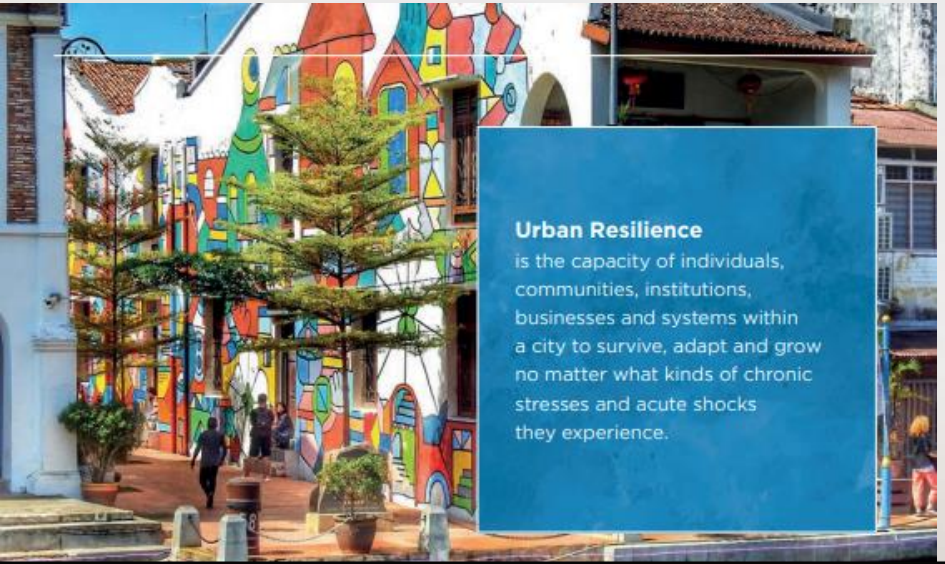
Reflective
using past experience to inform future decisions

Resourceful
recognizing alternative ways to use resources

Inclusive
prioritize broad consultation to create a sense of shared ownership in decision making

Integrated
bring together a range of distinct systems and institutions

Flexible
willingness, ability to adopt alternative strategies in response to changing circumstances



Robust
well-conceived, constructed, and managed systems

Redundant
spare capacity purposively created to accommodate disruption

withstand, respond to, & adapt more readily to shocks & stresses to bounce back stronger after tough times & live better in good times.

The Prominence of Resilience in Major International Frameworks

The Sustainable Development Goals

2015-2030[24]

Prominence of resilience

Goal 1: No poverty
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

Goal 2: Zero Hunger
Ensure sustainable food production systems and implement *resilient* agricultural practices

Goal 9: Industry, innovation and infrastructure
Build *resilient* infrastructure

Goal 11: Sustainable cities and communities
Make cities and human settlements inclusive, safe, *resilient* and sustainable

Goal 13: Climate Action
Strengthen *resilience* and adaptive capacity to climate-related hazards and natural disasters in all countries

Goal 14: Life below water
Strengthen the *resilience* of marine and coastal ecosystems

The Prominence of Resilience in Major International Frameworks

Sendai Framework for Disaster Risk Reduction
2015-2030[25]

Prominence of resilience

Goal
'Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive… measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus *strengthen resilience*' through:

Priority 1
Understanding disaster risk

Priority 2
Strengthening disaster risk governance to manage disaster risk

Priority 3
Investing in disaster risk reduction for *resilience*

Priority 4
Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction

SENDAI FRAMEWORK
FOR DISASTER RISK REDUCTION 2015-2030

The SFDRR aims to substantially reduce 'Disaster risk & losses in lives, livelihoods & health & in the economic, physical, social, cultural & environmental assets of persons, businesses, communities & countries'

by preventing & reducing hazard, exposure & vulnerability to disasters, increasing preparedness for response & recovery, & thus strengthening resilience.

The Prominence of Resilience in Major International Frameworks

COP21: UN Climate Change Conference

Beyond 2020[26]

Prominence of resilience

The framework calls for:

International, regional and national financial institutions to report on the manner in which development assistance and climate finance programmes incorporate climate-proofing and climate *resilience* measures

The identification of concrete opportunities for strengthening *resilience* and reducing vulnerabilities

Scaling up efforts to reduce emissions and/or to build *resilience* and decrease vulnerability to the adverse effects of climate change

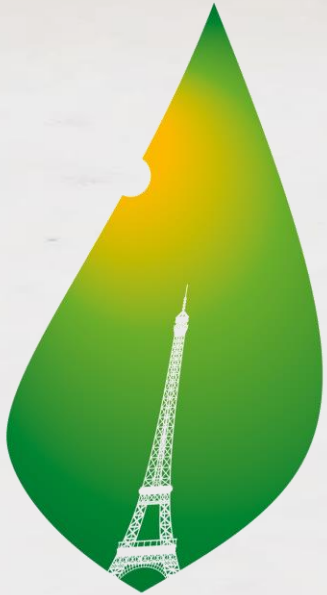
Ensuring the adequate financing of climate-*resilient* development

The establishment of a global goal on enhancing adaptive capacity, strengthening *resilience* and reducing vulnerability to climate change

Building the *resilience* of socioeconomic and ecological systems, including through economic diversification and sustainable management of natural resources

Building the *resilience* of communities, livelihoods and ecosystems

Realising technology development and transfer in order to improve *resilience* to climate change and to reduce greenhouse gas emissions



COP21 · CMP11

PARIS 2015

UN CLIMATE CHANGE CONFERENCE

The Paris Agreement often referred to as the Paris Accords or the Paris Climate Accords, is an international treaty on climate change. Adopted in 2015, the agreement covers climate change mitigation, adaptation, and finance

Resilient Built Environment

Tactical FM

(1) improving quality
(2) Reducing cost &
(3) Minimising risk

Risks in FM

Tactical FM

(1) improving quality
(2) Reducing cost &
(3) Minimising risk

=

expose (someone or something valued) to danger, harm, or loss.

When planning actions to respond to identified risks, facility managers should establish a Risk Register. they should assess and document:

1) the likelihood of an occurrence of an identified risk
2) the likely impact of an occurrence
3) options for actions to prevent or reduce the likelihood of an occurrence
4) options to reduce the impact of an occurrence (i.e. mitigation) &
5) the degree of acceptability of any residual risk.

RICS (2018)

Risks Modelling in Resilience FM

- UNDRR Global Assessment Report, 2015-

Tactical FM

(1) improving quality
(2) Reducing cost &
(3) Minimising risk

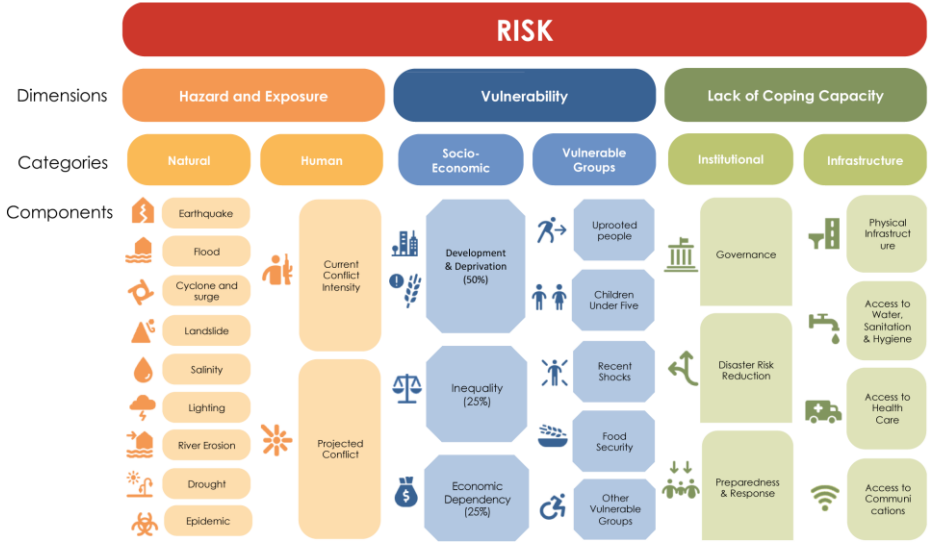
Disaster Risk

Tactical FM

= Disaster risk is expressed as the likelihood of loss of life, injury or destruction & damage from a disaster/crisis in a given period of time.

- Disasters are not natural. Hazards may be natural but they don't have to turn into disasters.
- Disaster risk is therefore considered as the combination of the severity & frequency of a hazard, the numbers of people & assets exposed to the hazard, & their vulnerability to damage.
- Disasters are the consequence of human decisions.

Disaster Risk



Indicators Overview

Hazard and Exposure

31 Indicators

Hazard and Exposure comprise 09 major components of natural hazards and exposures along with 02 human-made hazard components. In absence of localized earthquake exposure information and human hazard-related data, national-level data has been used from the global INFORM index.

Vulnerability

32 Indicators

Vulnerability dimensions are built up on the 03 components of socio-economic categories and 05 components of vulnerable groups. In absence of localized economic dependency-related specific indicator data, national-level indicators data has been used from the global INFORM index.

Lack of Coping Capacity

26 Indicators

Lack of Coping Capacity dimensions built up on the 03 components of Institutional categories and 04 components of Infrastructure categories. In absence of localized governance-related indicators data, national-level indicators data has been used from the global INFORM index.

03 Common Indicator has been used for analyzing and constructing the INFORM Sub-National Index

Hazard

Tactical FM

hazard

= A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social & economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socio-natural in origin.

-UNDRR Terminology, 2017-

1. Biological hazards

of organic origin or conveyed by biological vectors, including pathogenic microorganisms, toxins and bioactive substances

2. Environmental hazards

may include chemical, natural & biological hazards. Can be created by environmental degradation or physical or chemical pollution in the air, water & soil.

3. Geological or geophysical hazards

originate from internal earth processes. Examples are earthquakes, volcanic activity & emissions, & related geophysical processes such as mass movements, landslides, rockslides, surface collapses & debris or mud flows.

4. Hydrometeorological hazards

of atmospheric, hydrological or oceanographic origin. Examples are tropical cyclones (also known as typhoons and hurricanes); floods, including flash floods; drought; heatwaves and cold spells; and coastal storm surges. Hydrometeorological conditions may also be a factor in other hazards such as landslides, wildland fires, locust plagues, epidemics & in the transport and dispersal of toxic substances and volcanic eruption material.

5. Technological hazards

originate from technological or industrial conditions, dangerous procedures, infrastructure failures or specific human activities. Examples include industrial pollution, nuclear radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires and chemical spills.

Hazard

Tactical FM

hazard

A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social & economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socio-natural in origin.

-UNDRR Terminology, 2017-

Exposure

Tactical FM

= The situation of people, infrastructure, housing, production capacities & other tangible human assets located in hazard-prone areas.

-UNDRR Terminology, 2017-

People & economic assets become concentrated in areas exposed to hazards through processes such as population growth, migration, urbanization & economic development. Previous disasters can drive exposure by forcing people from their lands & to increasingly unsafe areas. Consequently, exposure changes over time & from place to place.

Many hazard prone areas, such as coastlines, volcanic slopes & flood plains, attract economic & urban development, offer significant economic benefits or are of cultural or religious significance to the people who live there. As more people & assets are exposed, risk in these areas becomes more concentrated. At the same time, risk also spreads as cities expand & as economic & urban development transform previously sparsely populated areas.
Exposure is connected to vulnerability x hazards in risk modeling

Exposure

Tactical FM

=

Source:
Exposure Elements in Disaster Databases and Availability for Local Scale Application: Case Study of Kuala Lumpur, Malaysia

Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) (2021)

Exposure elements in SFDRR	Exposure elements in Kuala Lumpur	Source of information (website)	Database URL	Processing
Health facilities	Hospital	Ministry of health Malaysia	https://www.moh.gov.my/index.php/database_stores/store_view/3	Individual plot of addresses in google earth pro (.kml) were imported to ArcGIS (.shp)
Education facilities	School	Ministry of education Malaysia	https://www.moe.gov.my/en/statistik-menu/senarai-sekolah-mengikut-kumpulan-jenis-dan-negeri	Individual plot of schools in google earth pro (.kml) were imported to ArcGIS (.shp)
Basic services Social aspect	TNB stations	Tenaga national berhad	https://www.st.gov.my/ms/web/general/details/273	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Sewage treatment plan	Indah water konsortium	https://www.iwk.com.my/do-you-know/sewage-characteristics	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Road	Open street map	https://www.openstreetmap.org/#map=6/4.116/109.455	Imported to ArcGIS (.shp)
	Water treatment plan	Indah water konsortium	https://www.iwk.com.my/do-you-know/sewage-characteristics	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Solid waste disposal center	Solid waste management and public cleansing corporation	https://www.swcorp.gov.my/solidwastemngmnt/	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Landfills	Solid waste management and public cleansing corporation	https://www.swcorp.gov.my/solidwastemngmnt/	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Old landfills	Solid waste management and public cleansing corporation	https://www.swcorp.gov.my/solidwastemngmnt/	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Transfer station	Solid waste management and public cleansing corporation	https://www.swcorp.gov.my/solidwastemngmnt/	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Police station	Royal Malaysian Police	https://www.rmp.gov.my/	Individual plot of addresses in google earth pro (.kml) were imported to ArcGIS (.shp)
	Fire station	Fire and Rescue dept. Malaysia	https://www.bomba.gov.my/	Individual plot of addresses in google earth pro (.kml) were imported to ArcGIS (.shp)
	Heritage building	Jaburan Warisan Negara	http://www.heritage.gov.my/	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Place of worship	Dept. of federal Territory Islamic affairs and Statistical Dept	https://www.jawi.gov.my/index.php/my/and https://www.dosm.gov.my/v1/	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Multipurpose hall	Open street map	https://www.openstreetmap.org/#map=6/4.116/109.455	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
Economic aspect	PPA/PPR	Statistical Dept	https://www.dosm.gov.my/v1/	Descriptive format (excel list) were plotted individually in google earth pro (.kml) and imported to ArcGIS (.shp)
	Elite condominium	Real Estate	www.iproperty.com.my and https://www.propertyguru.com.my/	Individual plot of addresses in google earth pro (.kml) were imported to ArcGIS (.shp)

Exposure

Tactical FM

Exposure

The situation of people, infrastructure, housing, production capacities & other tangible human assets located in hazard-prone areas.

-UNDRR Terminology, 2017-

Vulnerability

Tactical FM

= The characteristics determined by physical, social, economic & environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

-UNDRR Terminology, 2017-

Physical factors
e.g. poor design & construction of buildings, unregulated land use planning

Social factors
e.g. poverty and inequality, marginalisation, social exclusion and discrimination by gender, social status, disability and age (amongst other factors) psychological factors, etc

Economic factors
e.g. the uninsured informal sector, vulnerable rural livelihoods, dependence on single industries, globalisation of business and supply chains, etc

Environmental factors
e.g. poor environmental management, overconsumption of natural resources, decline of risk regulating ecosystem services, climate change, etc.

Vulnerability

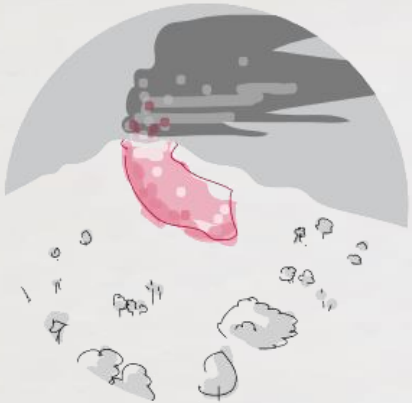
Tactical FM

The characteristics determined by physical, social, economic & environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

-UNDRR Terminology, 2017-

Risk, Hazard, Exposure &Vulnerability

Risk and the context of hazard, exposure and vulnerability



There is no such thing as a **natural disaster**, only **natural hazards**

We make **choices** as to where we inhabit, how we build and what research we do

Risk is the combination of **hazard**, **exposure** and **vulnerability**

Death, **loss** and **damage** is the function of the context of hazard, exposure and vulnerability

(Source: UNDRR 2019)

“Managing People..”

“Managing Places..”

Global Technopreneur University 2030

“How to Build Back Better..?”

UTHM Universiti Tun Hussein Onn Malaysia

KANZU Academy

RESILIENT BUILT ENVIRONMENT

Resilience FM

To FM practitioners, resilience should be related to strategy, **capacity**, coping capacity & often understood as follows:

1. Resilience: the ability of FM practices to flourish in the face of disaster risk.

2. Capacity: strengths & resources available to anticipate, cope with, resist & recover from any disasters/CRISIS.

3. Coping capacity: the ability to face & manage disasters

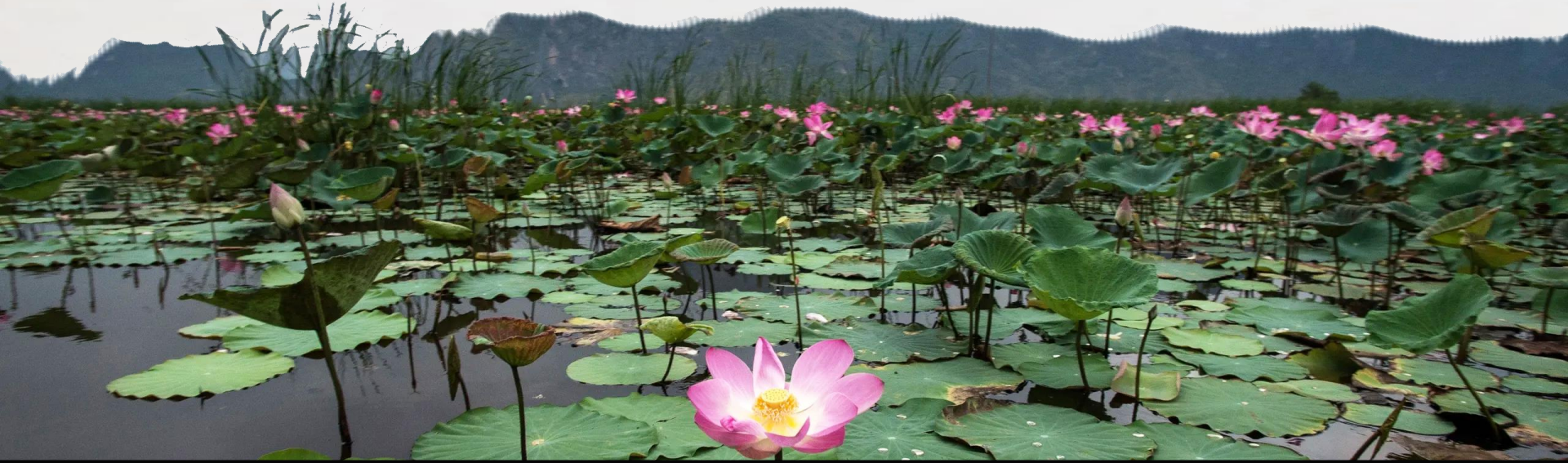
ARA Environment : Agile

ARA Environment : Resilient

“No Mud, No Lotus”

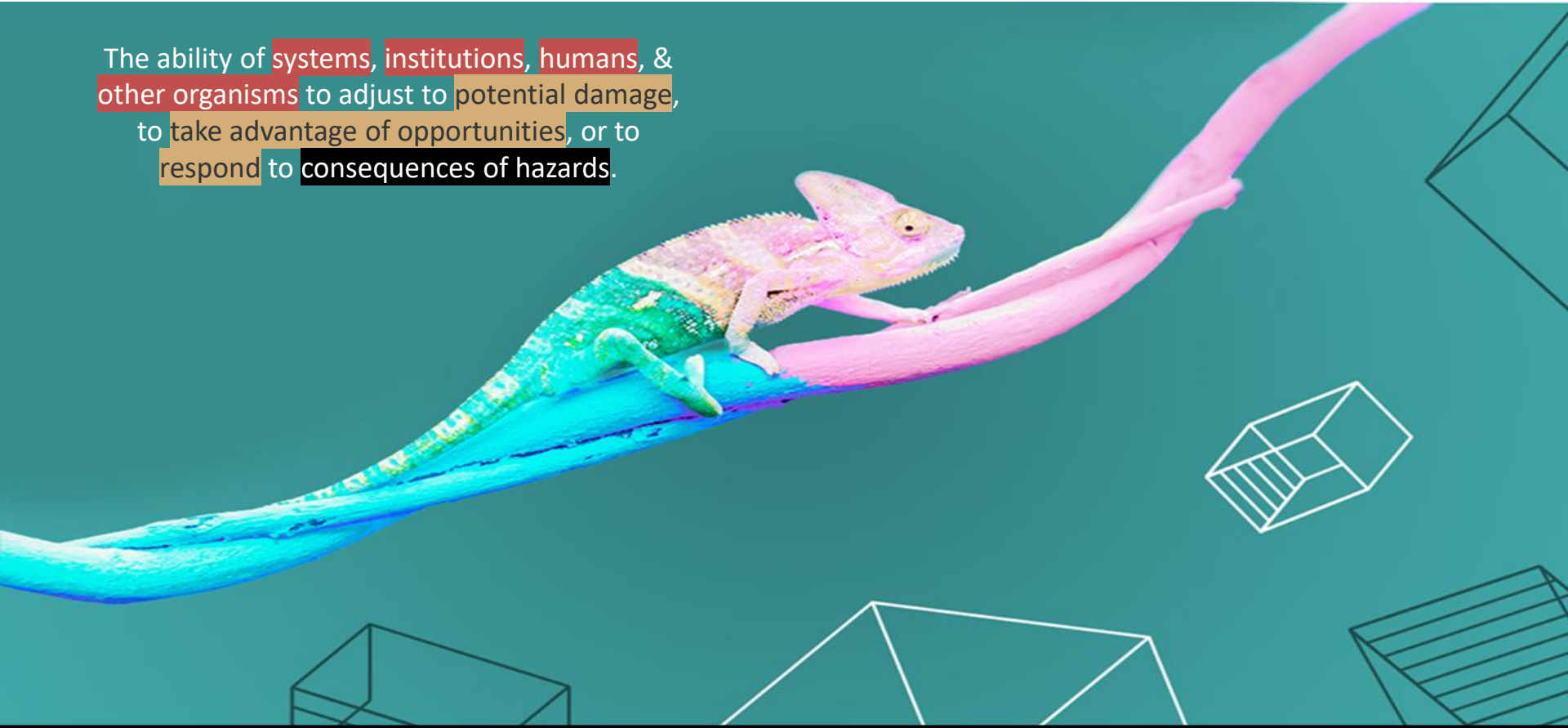
The Art of Transforming Suffering

SURVIVING AFTER A DISASTER, IS A BEAUTIFUL SURVIVAL.
STAND THE STORM AND RAIN, RISE AGAIN & BLOOM.
-BUILD BACK BETTER-



ARA Environment: Adaptive Capacity

The ability of systems, institutions, humans, & other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences of hazards.



Conclusion

1) UNDERSTANDING RISK (HAZARD, EXPOSURE & VULNERABILITY) IS CRITICALLY IMPORTANT IN TACTICAL FM.

2) MITIGATING RISK EFFICIENTLY WILL AFFECT THE QUALITY & COST OF MANAGING FACILITIES. IT CAN HELP TO REDUCE/AVOID SUB-SET OF HAZARDS.

3) BUILT ENVIRONMENT SYSTEMS INVOLVING COMPLEX & RISK-SENSITIVE URBAN DEVELOPMENT/MANAGEMENT PROCESSES, CLIMATE CHANGE, env degradation, EXTREME WEATHER EVENT (EWE) CREATING NEW, INTERCONNECTED RISKS.

4) RESILIENCE, AGILE & ADAPTIVE STRATEGIES ARE NEEDED IN FM ECOSYSTEM.

5) FM PRACTITIONERS MUST ASSOCIATE/EMBED INTERNATIONAL & NATIONAL FRAMEWORKS TO MITIGATE RISK AS WELL AS DEVELOP RISK PROFILE & RISK REGISTER IN ITS ORGANISATION.

6) THE ABILITY OF COMMUNITIES, SOCIETIES & SYSTEMS TO RESIST, ABSORB, ACCOMMODATE, RECOVER FROM DISASTERS/CRISIS, WHILST AT THE SAME TIME IMPROVE WELLBEING, IS KNOWN AS RESILIENCE.

1. MOBILISE Project (2017-2021)

A Collaborative Multi-Agency Platform for Building Resilient Communities

MOBILISE
Building Resilient Communities

Prof Terrence Fernando
University of salford

AP Sr Dr Noralfishah Sulaiman
KANZU RESEARCH, UTHM

Prof udaya kulatunga
University of moratuwa

Dr mustaq ahmad jan
University of peshawar

GCRF
UKRI Engineering and Physical Sciences Research Council

Project Value: GBP 1.2 mil (MYR8.2 mil)
Project Period: 2017-2021
Started May 2017

Tackling global development challenges through digital technologies + disaster research.

Aim : To develop a digital infrastructure that can offer intelligence to a range of agencies to work together to reduce the impact of disasters such as floods and landslides on communities.

2. transcend Project (2019-2022)

Technology Enhanced Stakeholder Collaboration for Supporting Risk-Sensitive Sustainable Urban Development

Prof Terrence Fernando
University of salford

Sr Dr Noralfishah Sulaiman
KANZU RESEARCH, UTHM

Prof udaya kulatunga
University of moratuwa

Dr mustaq ahmad jan
University of peshawar

GCRF

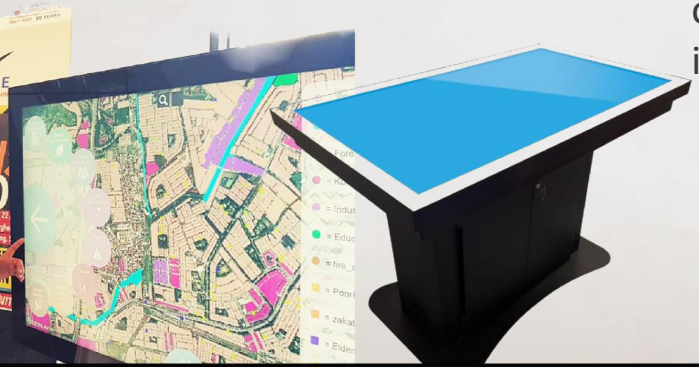
UKRI Economic and Social Research Council

Project Value: GBP855,528.00 (MYR 5.2 mill)
Project Period: 2019-2023

MOBILISE Building Resilient Communities

Transcend

The ARA Environment



Agility is the **capacity for moving quickly**, flexibly, & decisively in anticipating, initiating, and taking advantage of opportunities, & avoiding any negative consequences of change.

Resilience helps people rebound & manage through adversity & extreme change.

Adaptive governance is Governance that promotes cross-organisational collaboration, openness, adaptability, learning, impartiality, power sharing and public participation…

(Thomalla et al., 2018)

RESILIENT4WRD LAB
Resilient & Agile Cities for Future

MOBILISE Transcend
Building Resilient Communities

SMA

KANZU RESEARCH | RESILIENT BUILT ENVIRONMENT

UTHM
Universiti Tun Hussein Onn Malaysia

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES
17 PARTNERSHIPS FOR THE GOALS

A system is defined as a set of interrelated elements that interact with each other within some defined boundary and are organized to perform a function or follow some purpose
(1) Open Innovation & (2) Multi-agencies.

Living Lab

Resilient
Agile
Adaptive
ARA Environment
ARA Environment
ARA Environment

REAL-LIFE CONTEXT

(1) Users
Target group & behavioural definers

- sarawak state security & enforcement unit (ssseu/ukpS)
- urban development authorities
- local authorities (KuchIng North, south, K. Samarahan & padawan)
- community + public + NGOs

(2) Private actors
Practical know-how & resources

- sarawak digital economic corporation (sdec). private agencies, private technical teams, private technologists. eg. rs & gis, cream, futurise, cidb, mnj teras, microcorp sdn bhd & tegas.

(3) Knowledge institutes
Expertise & scientific substantiantion

- researchers & students (ug, ms, phd)
- kanzu research: rbe, uthm
- thinklab, university of salford, uk
- transcend team
- public & private universities from sarawak
- academic technical teams

(4) Public actors
Long term perspective & regulatory role

- government/policy makers+ decision makers
- sarawak state government
- sarawak disaster management agencies
- sarawak state security & enforcement unit (ssseu/ukps)
- sarawak multimedia authority (sma)

IR 4.0 Living Lab

KANZU Academy

RESILIENT BUILT ENVIRONMENT

Why Sarawak ?

MOBILISE

- The most ready state for digital transformation.
- A lot of digital white documents, strategies & programs.
- Sarawak digital economy strategy (2018-2022).
- Sarawak multimedia authority (SMA).
- Sarawak digital economy corporation (SDEC).
- Kuching smart city master plan (2021-2025).
- Posses a lot of technologists, digital experts in engineering, geo-spatial, construction technolgy, big data, AI.
- Tegas digital village & youngsters opening start-up.
- Active participation from local agencies/authorities.
- Visionary leaders !


Transcend
Transcend

The Hope …

Hope you to **understand & believe**
On days when all you **want to quit**
Push you again to **rise and achieve**
Ever **more** we are in need of it

"We didn't come this far , to only come this far…"

Kanzu Research

Thank You

KANZU RESEARCH | RESILIENT BUILT ENVIRONMENT