

BOOK OF PRESENTATIONS

ICDI UPDATE FORUM 2/2024

WEDNESDAY, 20 NOVEMBER 2024

@ ROOM ICB1102, ICDI BUILDING

Update info on :

**Odyssey in AI,
no NLP**

**Platforms, Payments and
Ecosystems for Cross Border
Commerce**

**This is the
future we
want**

**Complex
Networks**

**Flipped
Learning**



Preface

Welcome to the **International College of Digital Innovation Update Forum**, a dynamic platform dedicated to unveiling the latest advancements in technology and knowledge. This forum brings innovators, researchers, and thought leaders together to explore transformative ideas shaping the digital landscape and fostering progress across industries. To highlight the breadth of innovation and its impact on our world, we proudly present five insightful lectures on emerging technologies and groundbreaking concepts:

1. **"Odyssey in AI: Beyond Natural Language Processing"**

Embark on exploring cutting-edge AI applications that transcend traditional NLP, offering new possibilities in autonomous systems, predictive analytics, and advanced robotics. Odyssey in IA is a journey into the vast and multifaceted world of artificial intelligence—an expedition that deliberately steers clear of natural language processing (NLP). While NLP often captures the limelight in modern AI, this work celebrates the less discussed, yet equally fascinating, dimensions of the field. Our exploration spans domains that shape industries, push technological frontiers, and inspire new paradigms of human-machine collaboration. From computer vision and robotics to optimization algorithms, generative systems, and intelligent decision-making, this odyssey charts a course through the fundamental pillars of AI. This is not a rejection of NLP's impact but a conscious choice to illuminate areas where AI thrives beyond language. In these chapters, you'll encounter systems that learn from images, discover patterns in data, and solve complex problems without a single sentence or word in sight. Join me on this unconventional odyssey to appreciate AI's rich diversity and celebrate its ingenuity in ways that transcend the written and spoken word.

2. **"Digital Platforms, Payments, and Ecosystems for Cross-Border E-Commerce"**

Examine the evolution of global digital commerce, focusing on innovations in platforms and payment systems that enable seamless trade and economic growth across borders. In

the era of globalized commerce, the digital payments ecosystem has become the backbone of cross-border e-commerce, facilitated seamless transactions and bridged the gap between buyers and sellers worldwide. As technology advances and markets evolve, the ability to send and receive payments across borders is no longer just a convenience, it's a necessity for businesses to thrive in the digital age. This book delves into the intricacies of digital payment systems, uncovering the opportunities and challenges they present for cross-border e-commerce. From understanding payment gateways, currency conversions, and fraud prevention to navigating regulatory landscapes and addressing customer trust, this work provides a comprehensive guide to the financial mechanisms enabling global trade. Our focus extends beyond technical processes; we also explore the human and cultural dimensions of payments, examining how trust, accessibility, and user experience influence the adoption of digital payment solutions. Whether you are an entrepreneur, a developer, or simply curious about the technological and economic forces driving global e-commerce, this book invites you to explore the dynamic world of digital payments—a field that is redefining how the world connects and transacts.

3. **"This is the Future We Want: The Metaverse"**

Dive into the metaverse—a convergence of virtual and physical realities—where immersive technologies transform collaboration, entertainment, and community building. *This Is the Future We Want* is both a manifesto and a critique call to action and a lens to examine our collective aspirations in an age defined by technological momentum. It challenges conventional thinking about societal progress, offering an alternative framework shaped by the ethos of techno-accelerationism. In many countries, political discourse often fixates on linear spectrums—left versus right, progressive versus conservative. This binary lens, while convenient, falls short of capturing the dynamic complexities of modernity, particularly in the context of rapid technological change. Techno-accelerationists reject this oversimplification, proposing instead a focus on the interplay between humanity and innovation. The future we envision is not tethered to the constraints of old ideologies but is instead built upon the possibilities that emerging technologies can unlock. From artificial intelligence and bioengineering to space

exploration and decentralized economies, the tools to reshape our world are already here. Yet, their deployment is fraught with ethical dilemmas, societal inertia, and political resistance. This book invites you to step outside traditional paradigms and consider a future defined by intentional acceleration—a world where technology is not merely adopted but directed toward creating equitable, sustainable, and transformative outcomes. Together, let us embrace the untapped potential of innovation, acknowledging its risks while harnessing its power to shape the future we truly want.

4. **"Introduction to Complex Networks and Their Applications"**

Discover the fascinating world of complex networks and their practical applications in diverse fields such as social dynamics, transportation systems, and scientific research. Networks are everywhere. From the intricate web of social relationships to the vast connectivity of the internet, from the neural pathways of the human brain to the delicate ecosystems that sustain life—networks underpin much of the complexity we observe in the world. This book, *Introduction to Complex Networks and Their Applications*, serves as a gateway to understanding the structure, dynamics, and applications of these fascinating systems. The study of complex networks combines insights from graph theory, physics, computer science, biology, and social sciences, among other fields. It provides a unifying framework to analyze how components interact within a system and how those interactions give rise to emergent behavior. Whether it's uncovering the spread of information, optimizing transportation networks, or modeling epidemics, the principles of network science offer powerful tools for tackling real-world challenges. This book is designed to make the field accessible to both newcomers and those seeking to deepen their knowledge. Beginning with foundational concepts, it progresses to advanced topics, all while emphasizing practical applications in areas as diverse as sociology, technology, and healthcare. As you journey through these chapters, you'll not only gain a deeper appreciation for the interconnected nature of our world but also discover how network science can illuminate pathways to innovation and problem-solving. Welcome to the exploration of complex networks—an indispensable lens for understanding and shaping the systems that define our lives.

5. **"Flipped Learning: Redefining Education for the Digital Era"**

Explore how the flipped classroom model, powered by digital tools, is revolutionizing education by fostering active learning, critical thinking, and personalized experiences. Education is undergoing a seismic shift in the digital era. Traditional teaching models, long centered on lectures delivered within classroom walls, are giving way to innovative approaches that leverage technology to enhance engagement, collaboration, and deeper learning. At the forefront of this transformation is flipped learning—a paradigm that redefines the roles of educators and students alike. In the flipped learning model, students are introduced to new concepts outside of the classroom—often through digital content like videos or interactive resources—while class time is repurposed for active learning, problem-solving, and meaningful interaction. This approach empowers students to take ownership of their learning journey and allows educators to guide, mentor, and challenge their students more effectively. This book explores the philosophy, methodology, and impact of flipped learning, providing a comprehensive guide for educators, administrators, and learners. It delves into the practicalities of designing flipped classrooms, integrating technology, and fostering environments where critical thinking and creativity flourish. It also addresses the challenges of implementing flipped learning, including accessibility, resistance to change, and the need for professional development. As we navigate the opportunities and challenges of a rapidly evolving educational landscape, flipped learning offers a compelling vision for the future of education—one that prioritizes active engagement, personalized learning, and the cultivation of lifelong skills. Welcome to the journey of reimagining education for the digital era. These lectures reflect the essence of innovation and the pursuit of knowledge that defines the mission of the **International College of Digital Innovation**. Together, let us engage, learn, and envision a future driven by technology and creativity.

Odyssey In AI: No NLP!

Dr Séamus Lyons

25 years on from the start of a career in education, IT, Computer Science and Artificial Intelligence Research, there is only one statement remembered from the meeting where it began – “OK, as long as I don’t have to do any NLP (Natural Language Processing)!”

AI journey

Definition of odyssey:

“a long and eventful or adventurous journey or experience”

When we think of Artificial Intelligence we think of ChatGPT (Large Language Models called LLMs)

but, where did they come from?

AI & The past

what was AI research like 25 years ago?

AI Odyssey

- 25 years ago there was a meeting
- From this meeting I agreed my PhD
- The only statement that I remember from this meeting was when I agreed to my PhD with the condition

“no NLP”

Why? What is NLP?

Natural Language Processing (NLP) deals with the research of how to apply computational techniques on human language

- AI subfield
- ‘demanding’ area’ for research
- results notoriously difficult
- “can’t teach it to students as they would fail the course”

NATURAL LANGUAGE PROCESSING

Text Processing

- phrases, and structuring them to understand grammar and syntax
- **Semantic Analysis:** Determining the meaning of words in context (e.g. sentiment analysis)
 - **Named Entity Recognition (NER):** Identifying proper nouns like names of people, places, dates
 - **Text Generation:** Creating new text based on input, such as summaries or articles (e.g., GPT models)

Speech Processing

- **Speech Recognition:** Converting spoken language to text
- **Speech Synthesis:** Converting text back to human-sounding speech (TTS)

Other NLP areas

- **Information Retrieval**
- **Information Extraction**
- **Machine Translation**
- **Question Answering Systems**
- **Co-reference Resolution**

PhD

- Expertise in databases, XML and web systems
- Information overload was an issue
- Solution – extract information from web pages
 - turn semi-structured or unstructured data into structured data
 - example label:values and text into database input / XML
- This is called Information Extraction
- It is a field in Artificial intelligence (and NLP)

Research Lab – research

• information overload

- overload of information online – information extraction

• pattern recognition

- text-based (e.g. finding patterns in text)
- image-based (e.g. snake skin)
- anti-spam & content-based filtering
 - spam was a problem
 - inappropriate email (e.g. pornography)

According to a study by Websense in the early 2000s, **up to 30% of workplace internet use was unrelated to work tasks**, with some portion of this time spent on adult sites

• speech

- speech markup language (XML)
- Text-to-Speech systems (SAPI)
- translation to sign language

2005 American Management Association survey reported **that 76% of companies monitored workers' website visits**

• *other research included – NLP (WSD), Thai NLP, Computer Vision (VR gloves)*

and Language?

it's difficult

NLP taught in 2015

What is a conversation agent?

HAL 9000 (from 2001: A Space Odyssey)

Dave: *Open the pod bay doors, Hal.*

HAL: *I'm sorry Dave, I'm afraid I can't do that*

Virtual assistants:

- Siri, Apple
- Cortana, Microsoft
- M, Facebook
- Alexa, Amazon



I made her duck

1. I cooked [*animal-duck*] for her to eat
2. I cooked [*animal-duck*] belonging to her
3. I created the [*plastic-duck*] she owns
4. I caused her to quickly lower her head or body
5. I waved my magic wand and turned her into a [*animal-duck*]

Probabilistic Language Models

assign a probability to a sentence

- Machine Translation:

- $P(\mathbf{high} \text{ winds tonight}) > P(\mathbf{large} \text{ winds tonight})$

- Spelling Correction

- The office is about fifteen **minuets** from my house
 - $P(\text{about fifteen } \mathbf{minutes} \text{ from}) > P(\text{about fifteen } \mathbf{minuets} \text{ from})$

- Speech Recognition

- $P(\text{I saw a van}) \gg P(\text{eyes awe of an})$

Probabilistic Language Models

probability of an upcoming word:

$$P(w_5|w_1, w_2, w_3, w_4)$$

compute the probability of a sentence or sequence of words:

$$P(W) = P(w_1, w_2, w_3, w_4, w_5 \dots w_n)$$

Chain Rule of Probability

$P(\text{“water is so transparent”}) =$

$P(\text{is}|\text{water}) \times P(\text{so}|\text{water is}) \times P(\text{transparent}|\text{water is so})$

we could count and divide? Too many possible sentences

Markov Assumption

$P(\text{the} \mid \text{its water is so transparent that})$ *similar to*

$P(\text{the} \mid \text{transparent that})$

How many?

2 words = bigram

3 words = trigram

4 words = 4-gram

5 words = 5-gram

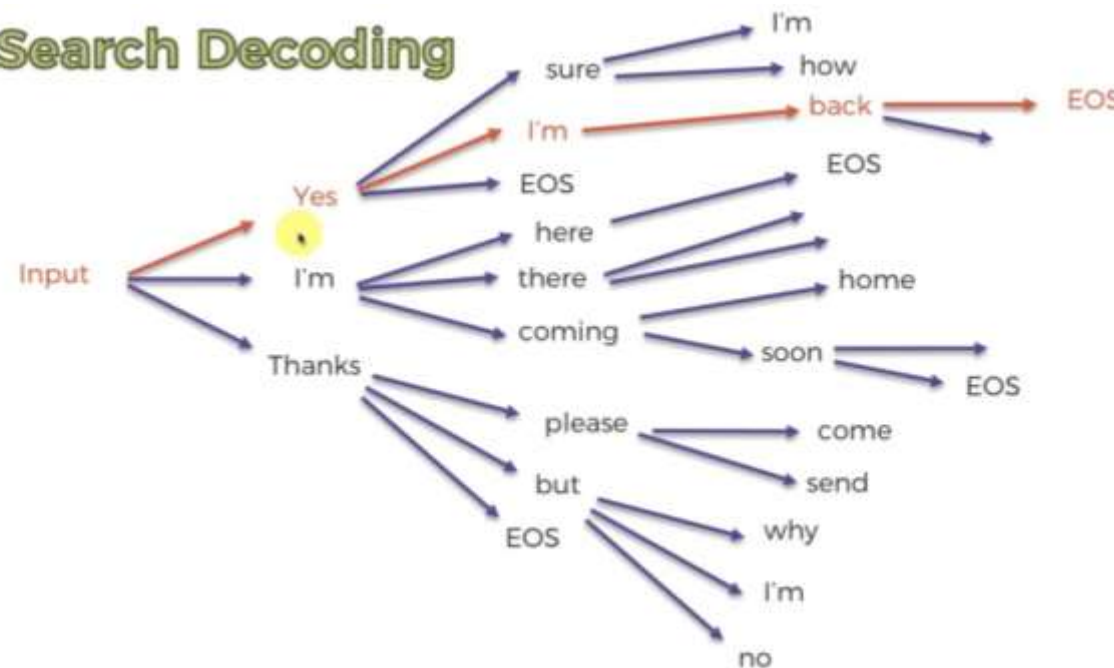
called n-grams

but we have long distance dependencies

SMT –

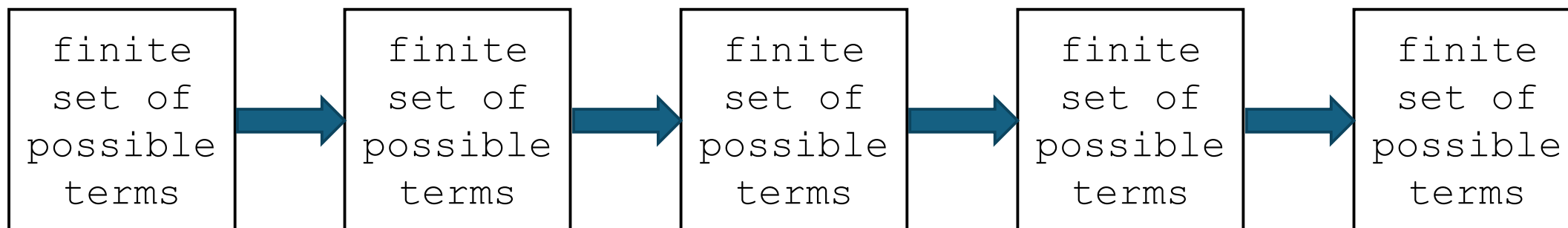


Beam Search Decoding



- English 500,000+ word dictionary
- probability of next word - too computationally expensive
- use beam search

$$P(w_5 | w_1, w_2, w_3, w_4)$$



but it has all changed!

the neural network revolution

Neural Networks

- We have known about neural networks for a long time
- It is said the first Artificial Neural Networks were **developed in the 1940s**
- 1983-1985 **Geoffrey Hinton** used tools from statistical physics to create the Boltzmann machine
- Even Recurrent neural networks (RNN) (used for NMT) was written about **in 1997** [1]



But now we have
the data and the
computing power

[1] Castaño, Asunción; Casacuberta, Francisco (1997). A connectionist approach to machine translation. 5th European Conference on Speech Communication and Technology (Eurospeech 1997). Rhodes, Greece. pp. 91-94. doi:10.21437/Eurospeech.1997-50.

Thai-English Machine Translation

is a good example of what has happened to AI and NLP

the story

Would Google Translation stay number one?

Who could develop the first successful NMT system?

TPUs and how long to converge

NMT = Neural Machine Translation

TPU = Tensor Processing Unit

the facts

- Google developed the first successful NMT system
- in 2016 Google launched its NMT-based Google Translate for several language pairs.
- Google did leverage extensive computational resources, including GPUs initially, and later integrated its proprietary TPUs to speed up inference and training times.
- However, there isn't strong evidence that the initial NMT system specifically took three months to converge using TPUs.
- Research in Canada: The University of Montreal, led by **Yoshua Bengio** and contributions from **Kyunghyun Cho** and others, was among the pioneering teams in neural machine translation.
- They helped develop early NMT models and contributed to the broader research that Google later built upon.

the *(small)* AI world

ILYa sutskever

[PDF] [Sequence to Sequence Learning with Neural Networks](#)

[I Sutskever](#) - arXiv preprint [arXiv:1409.3215](#), 2014 - [jeremy-su1.github.io](#)

Sequence to Sequence Learning with Neural Networks **Sequence to Sequence Learning with Neural Networks ...**

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ILYa sutskever

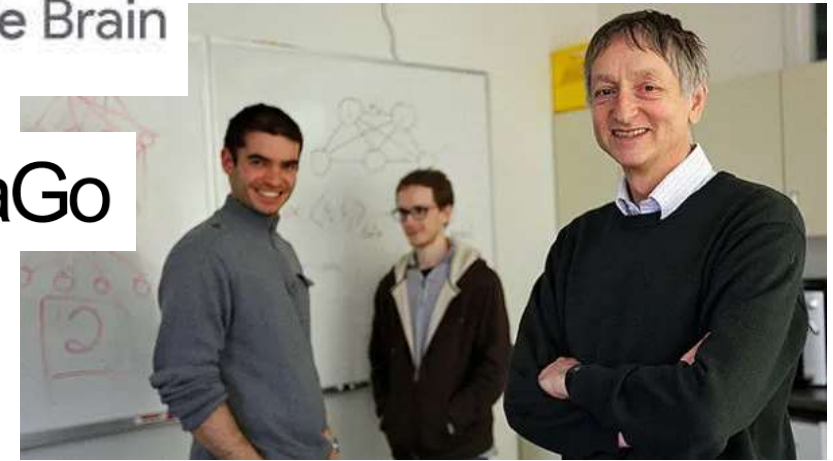


In 2012, Sutskever spent about two months as a postdoc with Andrew Ng at Stanford University. He then returned to the University of Toronto and joined Hinton's new research company DNNResearch, a spinoff of Hinton's research group.

In 2013, Google acquired DNNResearch and hired Sutskever as a research scientist at Google Brain.

At **Google Brain**, Sutskever worked with Oriol Vinyals and Quoc Viet Le to create the sequence-to-sequence learning algorithm, and worked on TensorFlow.

He is also one of the AlphaGo paper's many co-authors.



At the end of 2015, Sutskever left Google to become cofounder and chief scientist of the newly founded organization OpenAI. Sutskever is considered to have played a key role in the development of ChatGPT.

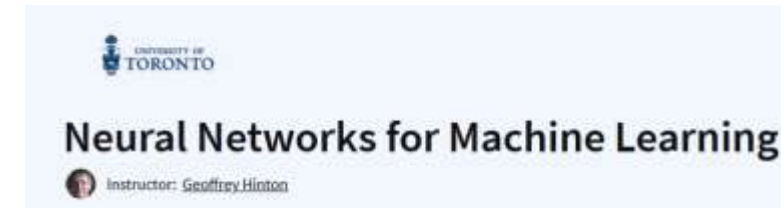
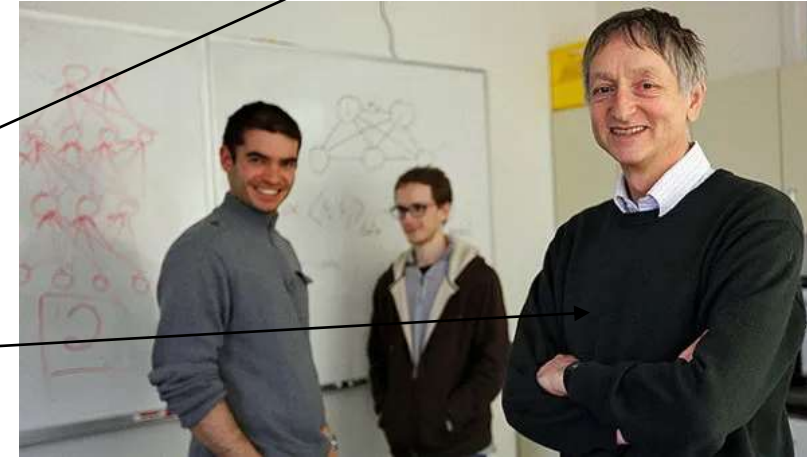
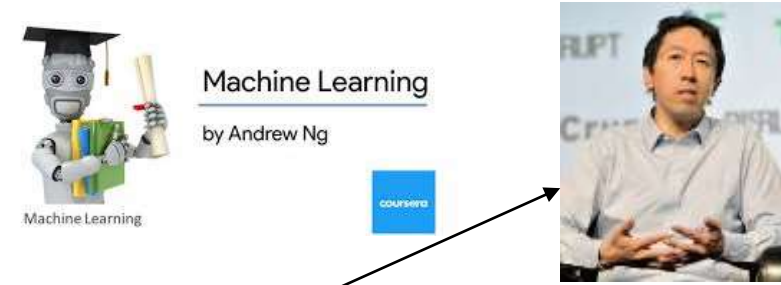
the ai world

early 2010's

- studied machine learning online with **Andrew Ng**
- studied neural networks online with **Geoffrey Hinton**

now

- retrieval augmented generation (RAG)
- AI safety and ethical considerations



progress

progress

iRobot Roomba (2002) The first commercially successful robot vacuum

<https://vacuumwars.com/history-of-the-robot-vacuum-cleaner/>

robot vacuum cleaners

22 years ago - not very good

22 years later - not very good



progress

- speech recognition (NLP in personal assistant)
 - except Scottish accent
 - but we still use keyboards & mice
- pattern recognition
 - object recognition — nearly at 100% world objects

ARTIFICIAL INTELLIGENCE

early 2010s

The adoption of **deep learning techniques**, led to significant advancements in NLP tasks such as machine translation, sentiment analysis, and speech recognition.

Deep learning models outperformed traditional methods, marking a shift towards more complex and capable AI systems

late 2010s

The introduction of **the transformer** (2017) allowed for more efficient processing of language data.

Leading to breakthroughs in translation and text generation tasks.

Transformers became the backbone for subsequent large language models (LLMs).

2020s

The emergence of LLMs transformed user interaction with AI.

The surge in generative AI applications has led to new creative possibilities in content generation.

This boom has also raised ethical concerns regarding

The **widespread integration of AI technologies** into consumer products and services—such as virtual assistants, customer service bots, and content recommendation systems—has made AI a ubiquitous part of daily life.

This has increased public awareness and demand for

MACHINE TRANSLATION

Statistical

- analyzed bilingual text corpora
- identify patterns and rules for translation
- breaks down sentences
- translating these units
- based on probabilities
- from training data
- dependent on the training data quality and quantity

Neural

- deep learning models
- used vast amounts of data
- handling long-range dependencies
- more natural-sounding results
- improving fluency and coherence

Attention

- focus on specific parts of the input
- when generating each word output
- improving accuracy for longer sentences
- has led to substantial improvements in translation quality,
- particularly for complex sentence structures

Transformers

- replaced recurrent neural networks
- with self-attention mechanisms allowing for parallelization
- significantly increasing efficiency
- Transformers have excelled in handling diverse languages and contexts,
- making them the current state-

LANGUAGE MODELS

Statistical

- Statistical Language Models operate on probabilistic principles,
- analyzing large corpora of text
- learn the likelihood of word sequences using n-grams.
- struggle with long-range dependencies
- resulting in less coherent and accurate outputs

Neural

- Neural Language Models created better language representation
- models could capture more complex patterns in data.
- They improved fluency and contextual understanding
- but still had scalability and language diversity problems.

Attention

- allowed models to focus on relevant parts of the input sequence
- when generating outputs.
- improved how models handled context.
- enhanced performance in tasks requiring understanding of longer contexts
- leading to more coherent outputs

Transformers

- revolutionized language modelling
- enabled the training of much larger models (LLMs)
- with billions of parameters,
- leading to unprecedented improvements in various NLP tasks
- such as translation, summarization, and question-answering

A review of Thai-English machine translation

Séamus Lyons¹ 

Received: 11 January 2019 / Accepted: 20 July 2020 / Published online: 14 August 2020

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17 months

required an
emergency re-write
of the NMT section

In ‘attention-based’ systems there is an attention mechanism between the encoder and decoder that allows the decoder to give greater importance to the nodes that have the highest scores in a weighting system. For example, if a word with the same meaning in a direct translation was placed much earlier in a sentence, then this could be given a higher weight thus giving it greater attention. Some issues are not solved using attention such as the inability to process input in parallel. If each word can be processed at the same time, such as with Convolutional Neural Networks (CNN), then parallelization could reduce the time overhead. The problem of dependencies when translating sentences still remain, so a combination of CNNs and attention was created to form the Transformer model (Vaswani et al. 2017). Transformers allow the decoder to focus on the relevant parts of the input sentence but also use a form of attention called self-attention that uses query, key and value vectors for each word to create scores that measure the relationship between the word and the other words in the sentence. Finally, the decoder chooses from a large selection of target-language words using a ‘softmax’ function. Systems can use a combination of words and sub-words to significantly reduce the problem caused by the large amount of output options.

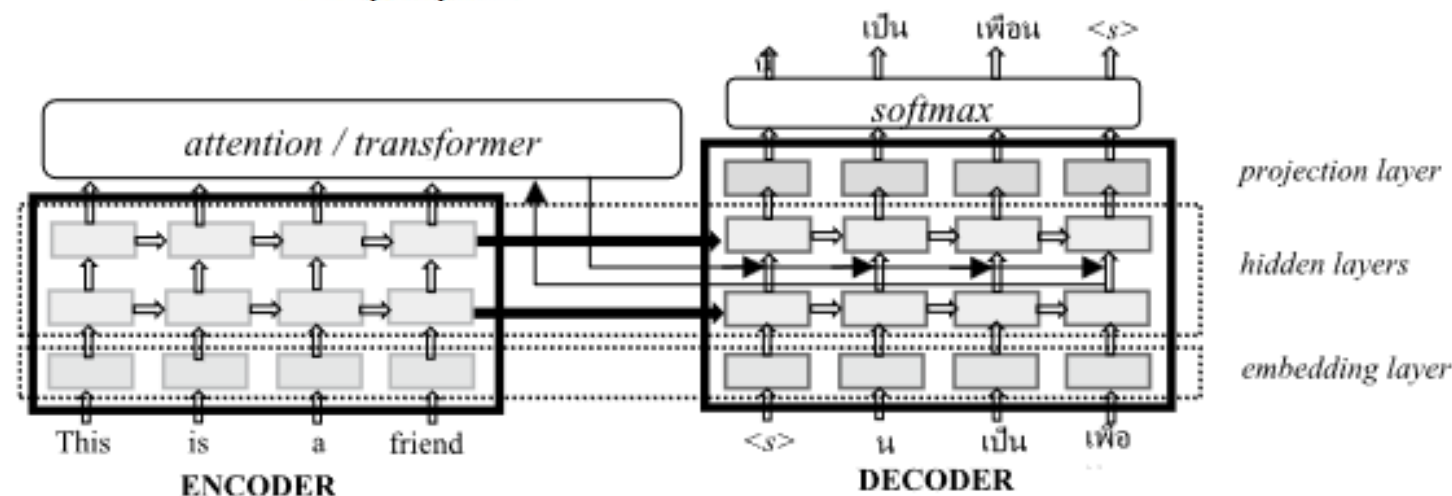


Fig. 5 A neural machine translation (NMT) system

and this week

Can General-Purpose Large Language Models Generalize to English-Thai Machine Translation?

**Jirat Chiaranaipanich¹, Naiyarat Hanmatheekuna², Jitkapat Sawatphol³, Krittamate Tiankanon⁴,
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Abstract

2 Experimental Setup

On Creating an English-Thai Code-switched Machine Translation in Medical Domain

**Parinthapat Pengpun^{1,†}, Krittamate Tiankanon^{2,†}, Amrest Chinkamol^{2,3},
Jiramet Kinchagawat², Pitchaya Chairuengjitjaras^{2,4}, Pasit Supholkhan⁵,
Pubordee Aussavavirojekul², Chiraphat Boonnag⁷, Kanyakorn Veerakanjana^{2,5,6},
Hirunkul Phimsiri⁴, Boonthicha Sae-jia⁴, Nattawach Sataudom²,
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Neural Networks

How have neural networks improved NLP?

01

Sentiment Analysis

Recurrent Neural Networks (RNNs) and **Transformers** have helped sentiment analysis evolve from simple word-based analysis to understanding nuanced opinions in text. Models like **BERT** and **RoBERTa** capture context more effectively, distinguishing subtle sentiment in complex reviews or social media posts.

02

Question Answering (QA)

Neural networks have enabled models to read passages and provide answers to questions with high accuracy. **BERT**, **GPT**, and other transformer-based models excel at QA tasks, leveraging their ability to understand and generate responses based on specific questions.

03

Text Summarization

Neural models generate concise summaries by identifying key information from larger documents. **Sequence-to-sequence (seq2seq)** models and **attention mechanisms** are particularly effective, enabling both extractive and abstractive summarization approaches.

04

Chatbots and Conversational Agents

Neural networks are behind more natural and coherent conversational agents.

Dialog systems like those in GPT and ChatGPT use transformers to manage context over long interactions, improving the relevance of responses in real-time conversations.

Neural Networks

How have neural networks improved NLP?

05

Named Entity Recognition (NER)

Neural networks have improved the accuracy of identifying names, dates, organizations, and other entities in text.

Bi-directional LSTM-CRF models, often combined with transformer embeddings, have set new benchmarks in extracting these details accurately.

06

Text Generation and Completion

Models like **GPT-3** can generate realistic text based on prompts, making significant strides in applications like automated writing, content generation, and code completion.

These models understand context well enough to complete or expand on text in a way that appears human-written.

07

Speech Recognition and Synthesis

Neural networks, particularly **convolutional neural networks (CNNs)** and **transformers**, have improved both transcription accuracy and natural-sounding speech synthesis.

Systems like **WaveNet** and **Tacotron** produce human-like voices, critical for virtual assistants and accessibility tools.

08

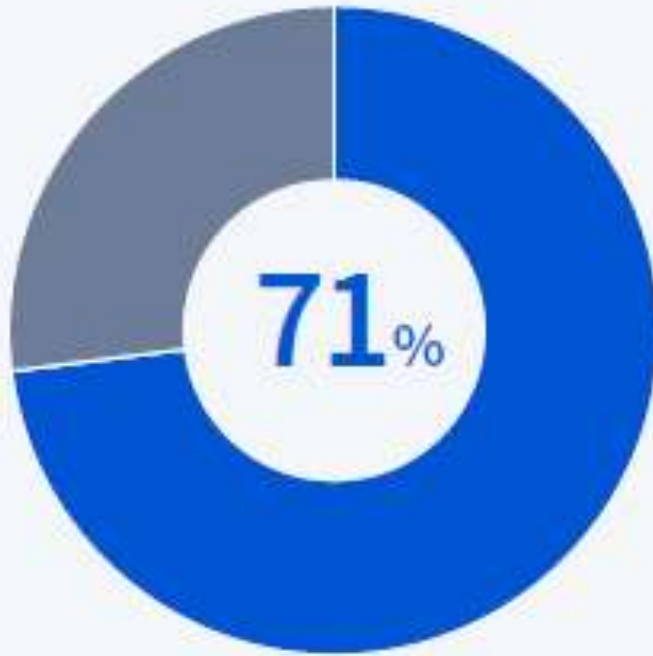
Grammar and Style Correction

Models like **T5** and **GPT** can detect and suggest corrections for grammar and style errors, often with human-like precision.

These models help in developing tools like Grammarly and Microsoft Editor, making grammar checks context-aware and more accurate.

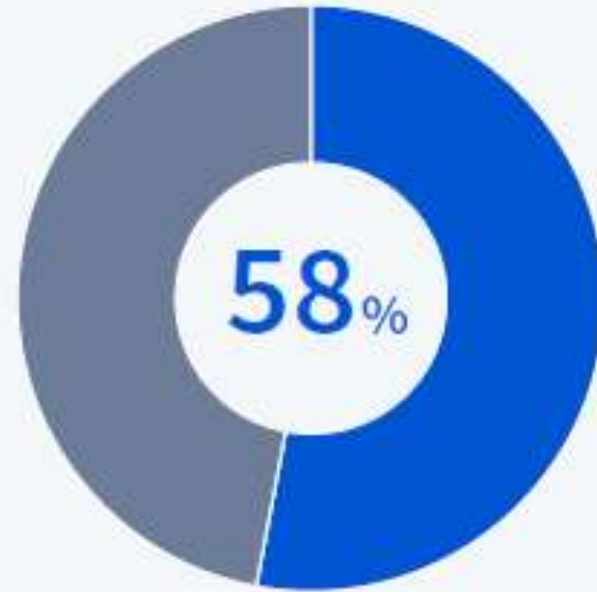
next stage?

do we need to understand ai ?



of business leaders say they would hire a less experienced candidate with AI skills over a more experienced candidate without

Generative AI in Higher Education



of higher education leaders say AI is reshaping their institution's policies—either by updating existing ones or creating new ones³

3. [2024 EDUCAUSE AI Landscape Study](#) (EDUCAUSE, February 2024)

but

but concerns

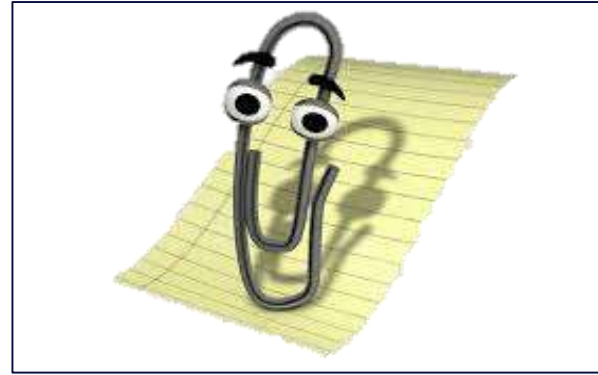
- TV that listens (Hitachi)
- Google sued (many times)
 - Google maps but took wireless data (in Germany)
- Facial recognition
 - one issue stopped implementation

"significant risks associated with AI around bias, copyright and misinformation that need to be addressed before we consider superintelligence. "

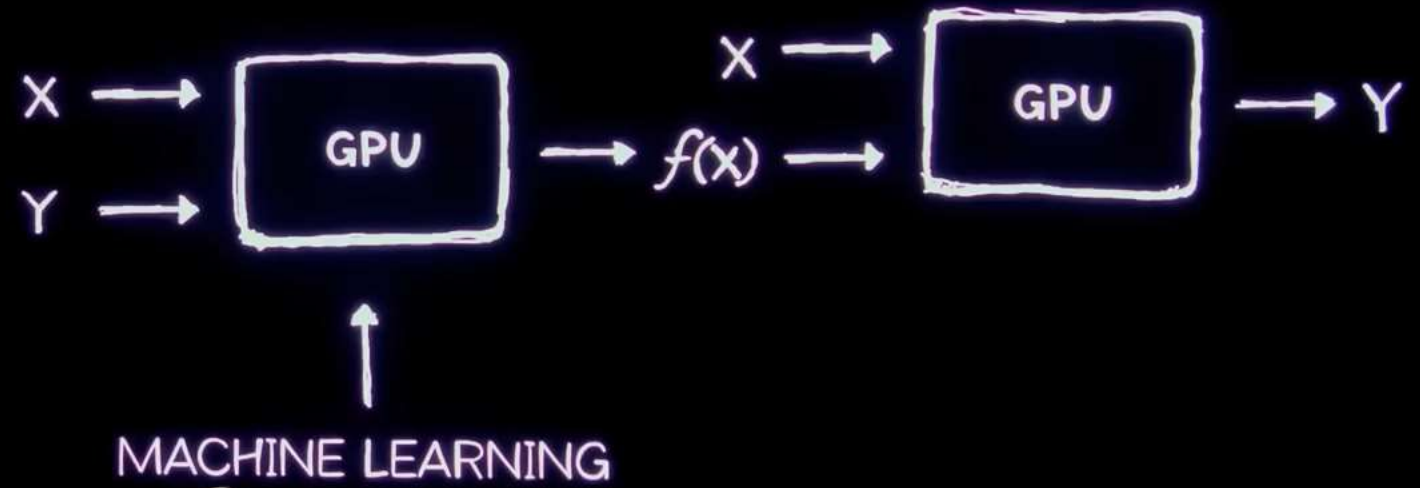
next

stage

- agents
- Autonomous AI Agents / Digital humans
 - mimic 'the brain' (Altera.ai)



SOFTWARE 2.0



form a holistic workflow

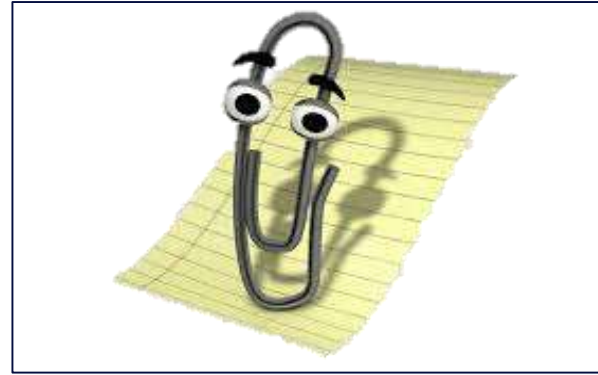
Artificial General Intelligence

Level 1	Chatbots	AI with natural conversation language abilities
Level 2	Reasoners	AI's with human-levels of problem solving across a broad range of topics
Level 3	Agents	AI systems that can take actions independently or from human instruction
Level 4	Innovators	AI that can aid in the invention of new ideas and contribute to human knowledge
Level 5	Organizations	AI that is capable of doing all of the work of an organization independently

next stage

- agents
- Autonomous AI Agents / Digital humans
 - mimic 'the brain' (Altera.ai)
- HAL

*2001 : a space
Odyssey*
- AI vs the 'use' of AI,
 - who makes the decisions?
 - OpenAI, Google, Anthropic, etc.?



charge – ethical trustworthiness score

USING AI

Geoffrey Hinton: 85

Recognized for his contributions to AI and advocacy for ethical considerations in AI development.

Yann LeCun: 85

Advocates for responsible AI development and has emphasized the importance of transparency and ethics in AI research.

Yoshua Bengio: 80

Known for his contributions to AI and deep learning, he has also expressed concerns about the ethical implications of AI technologies and the need for regulation.

Andrew Ng: 80

Known for promoting responsible AI use and education, with a focus on accessibility.

Sam Altman: 75

While he has pushed for innovation, his ties with Microsoft raise questions about transparency.

Bill Gates: 75

His philanthropic efforts in global health and education are notable, though his business practices have faced scrutiny.

Elon Musk: 70

Advocates for AI safety but has been criticized for inconsistent positions and aggressive tactics.

Steve Jobs: 65

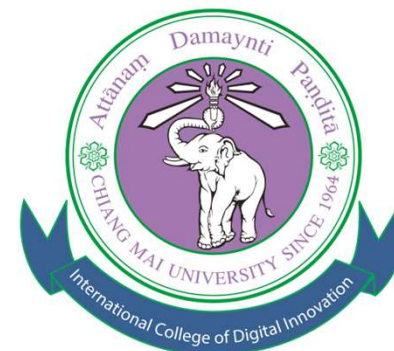
Innovative but often criticized for his management style and lack of transparency.

Mark Zuckerberg: 60

Faces significant trust issues due to privacy concerns and handling of misinformation on Facebook

Donald Trump's ethical trustworthiness score would likely be around 30 out of 100.

Thank you!



ICDI Update Forum
Digital Payments for Cross Border E-Commerce
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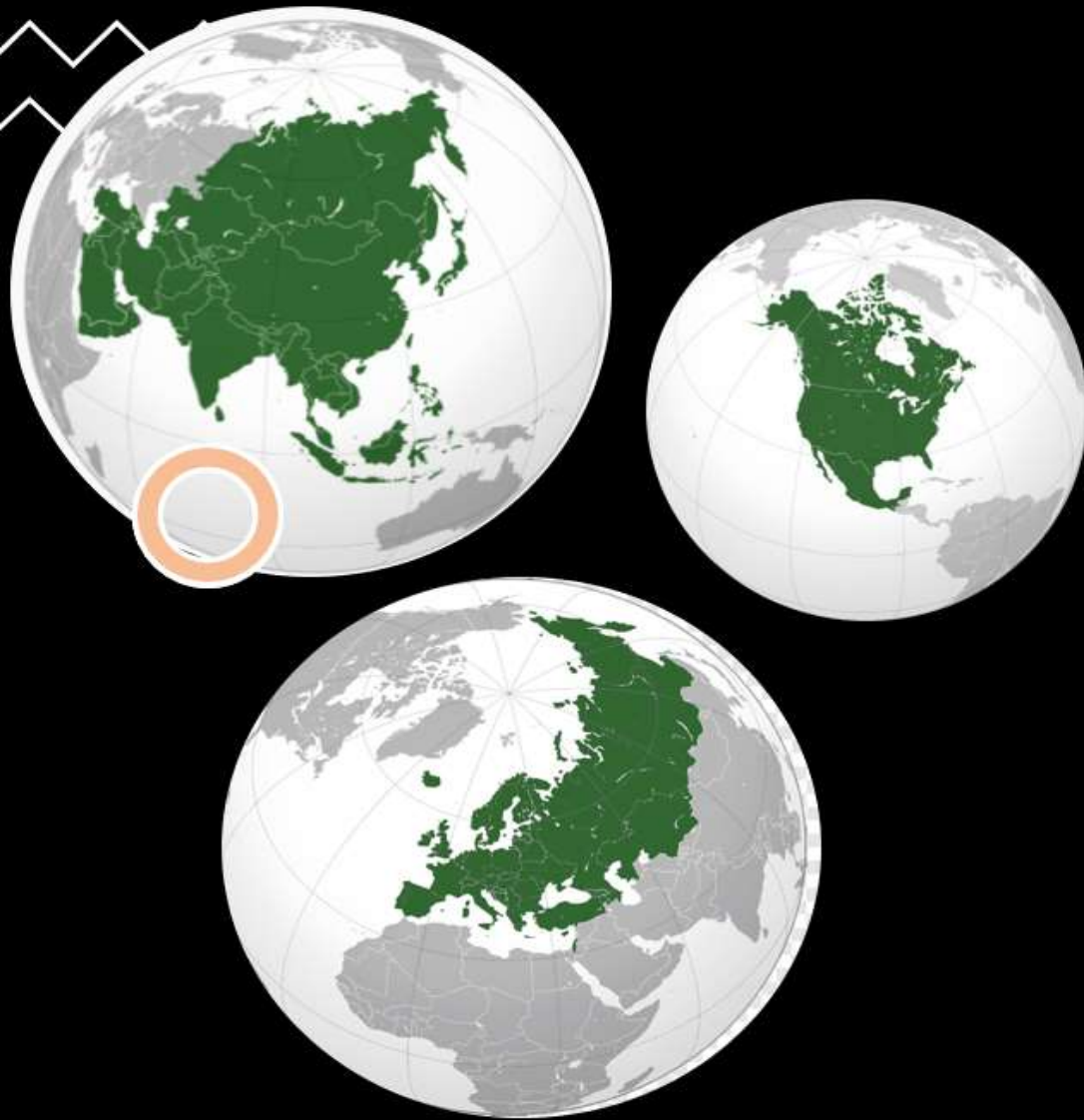
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[LINE/Wechat: drsivashankar](#)

Introduction

By globalization and digitalization, many countries are going in the way of growth. Due to geological advantage and people's friendly nature, Thailand's graph is growing higher. Thailand started to digitalize their banking and end-user transactions long ago, compared to other Asian countries. Government-based Commerce activities and peer-based cross-border E-commerce activities in Thailand are going hand in hand after the COVID-19 pandemic. Online market platforms in Thailand are the highest beneficiaries due to the government's policy, people's awareness, and digital payment systems. Thailand shall understand, analyse the business ecology, and make sure that Thailand harvests the real benefits out of the entities mentioned above. Due to global changes and leadership, Thailand is in the right state of situation to adopt and guide their people to obtain real fruits from cross-border e-commerce through digital platforms and digital payment systems.



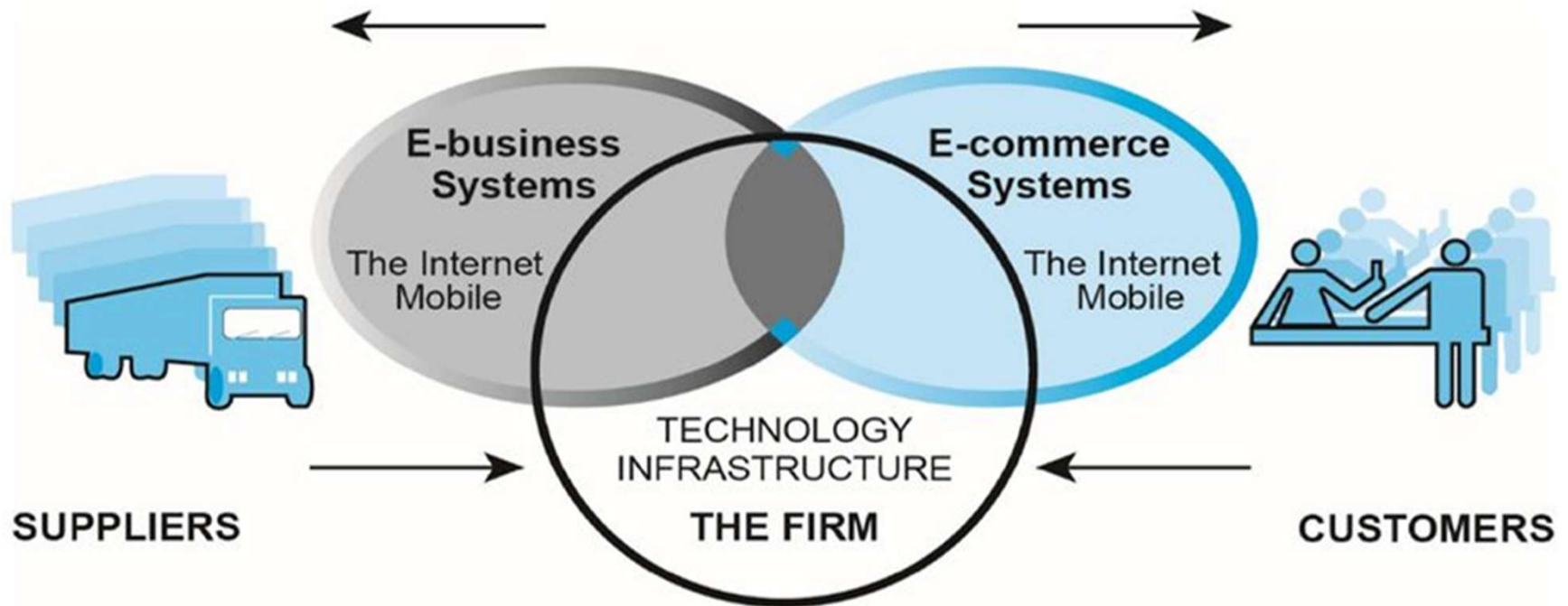
- The current population of Asia is 4,697,611,897 - Dec 6, 2021
- United Nations.
- Asia population is equivalent to **59.76% of the total world population**
- **CRYPTOCURRENCY is the first ASIAN Common Currency**

Are we really connected?



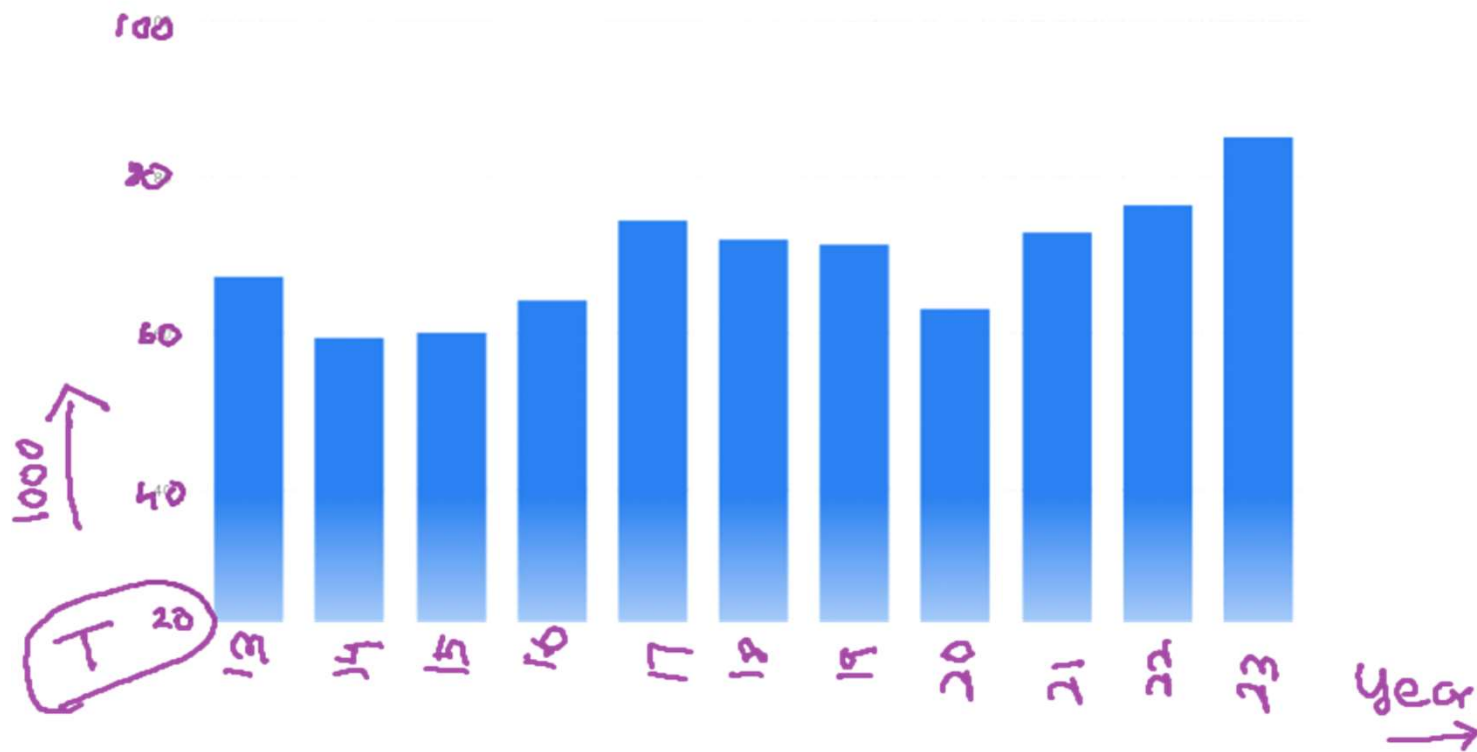
Major Languages?
Tourists?
Expectations?
Safety? For lone travelers
Payment systems
Transports?
Behavior?
Support?
Manners?
Mentality?

Before we get into Business.....

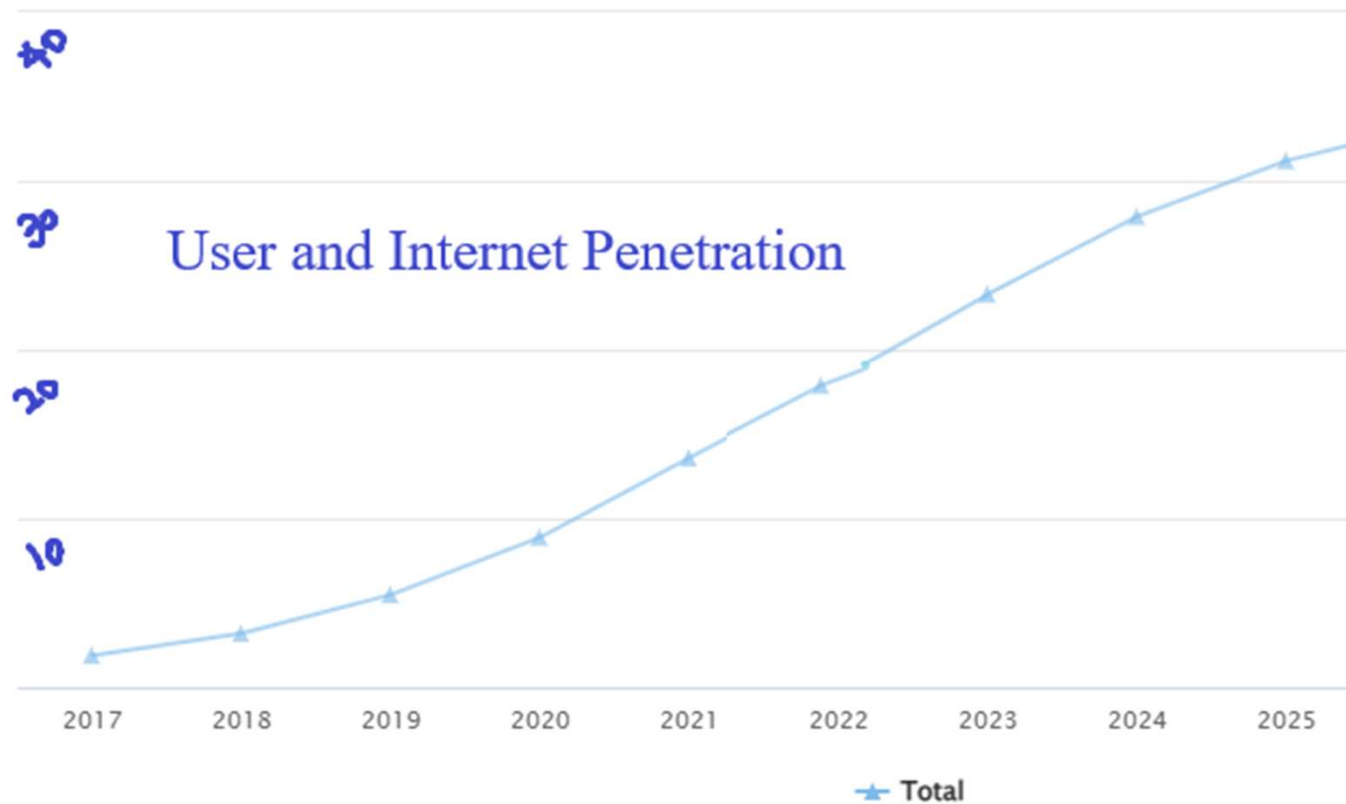


Copyright © 2018 Kenneth C. Laudon and Carol Guercio Traver

Companies registered in Thailand



Justify the need of Digital payments & adoption



Thailand's Profile on Digital payment& E-Commerce



Population

69 million²



Average age

38.1 years²



Online population

36.513 million³



GDP per capita

\$7,273⁴

Online Profile



Internet penetration

53%²



Smartphone penetration

63.9%²



eCommerce market value

\$26.2 billion²



Mobile commerce market value

\$13.6 billion²

Banking and Commerce



Banked population

81%²



Percent who shop
cross-border

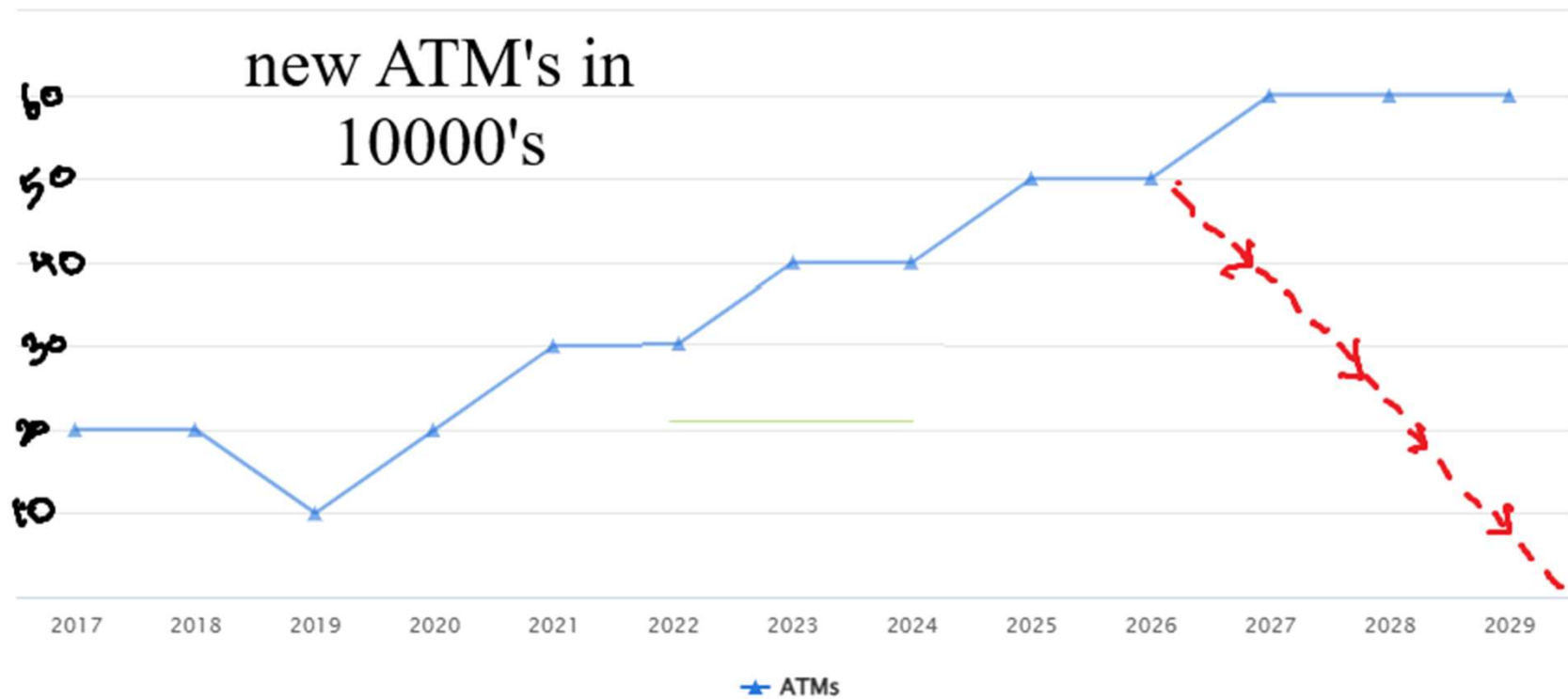
50%⁵



Percent with
credit card

10%⁶

Bank's Prediction Vs Conspiracy



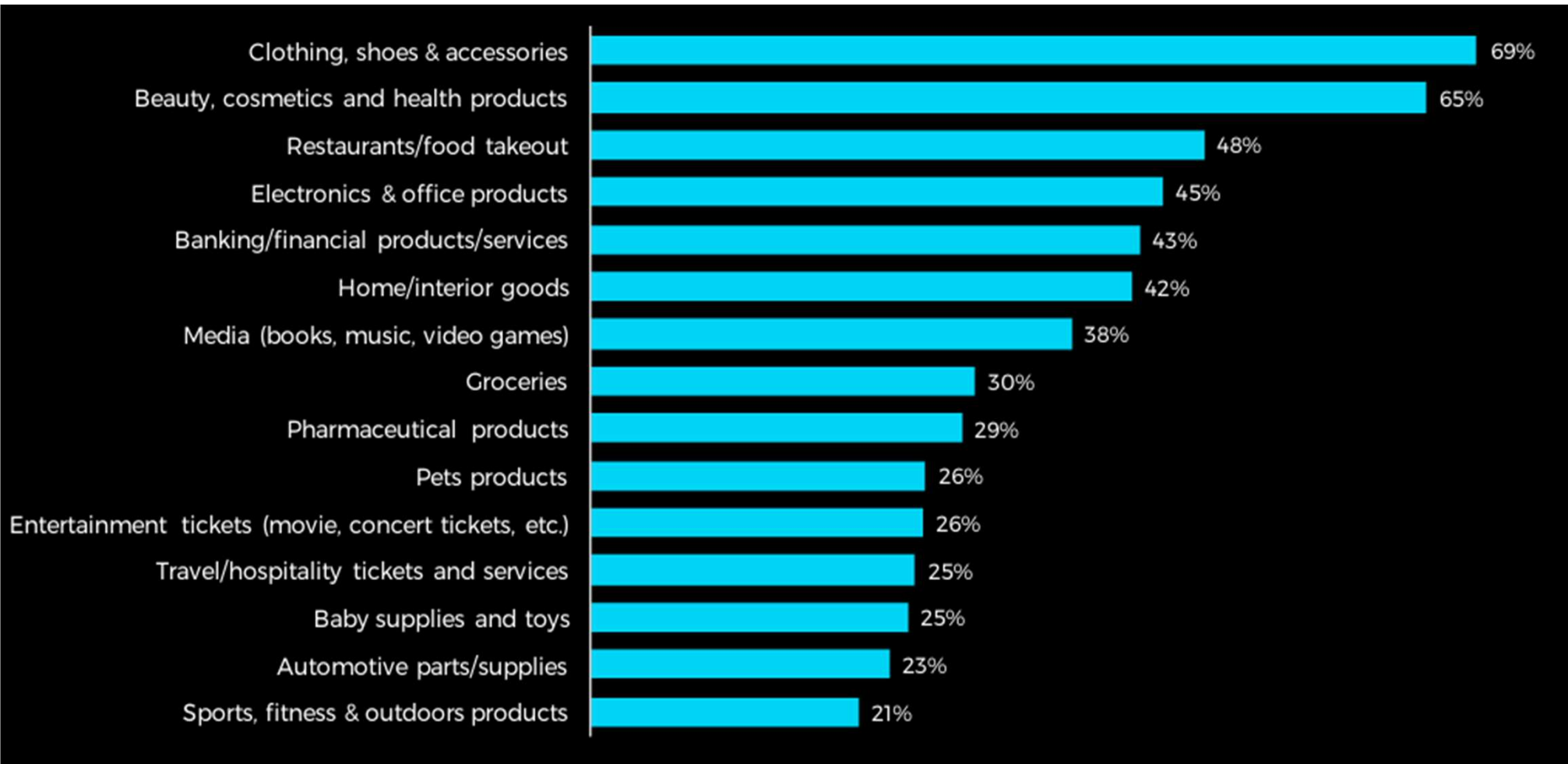
Can you give a try? Most & Quick Order's placed in....

- **Shopee**
- **Lazada**
- **Amazon**
- **Alibaba**
- **Tiktok**
- **Facebook**
- **Instagram**
- **Line Shopping**
- **JD Central**

Can you please share the product we ordered in Online Shopping platforms?

- I ordered my own HDMI Cable,
- Adaptor
- Books for Academia/Research
- Mouse
- Headphone,
- Office accessories
- Trekking shoe

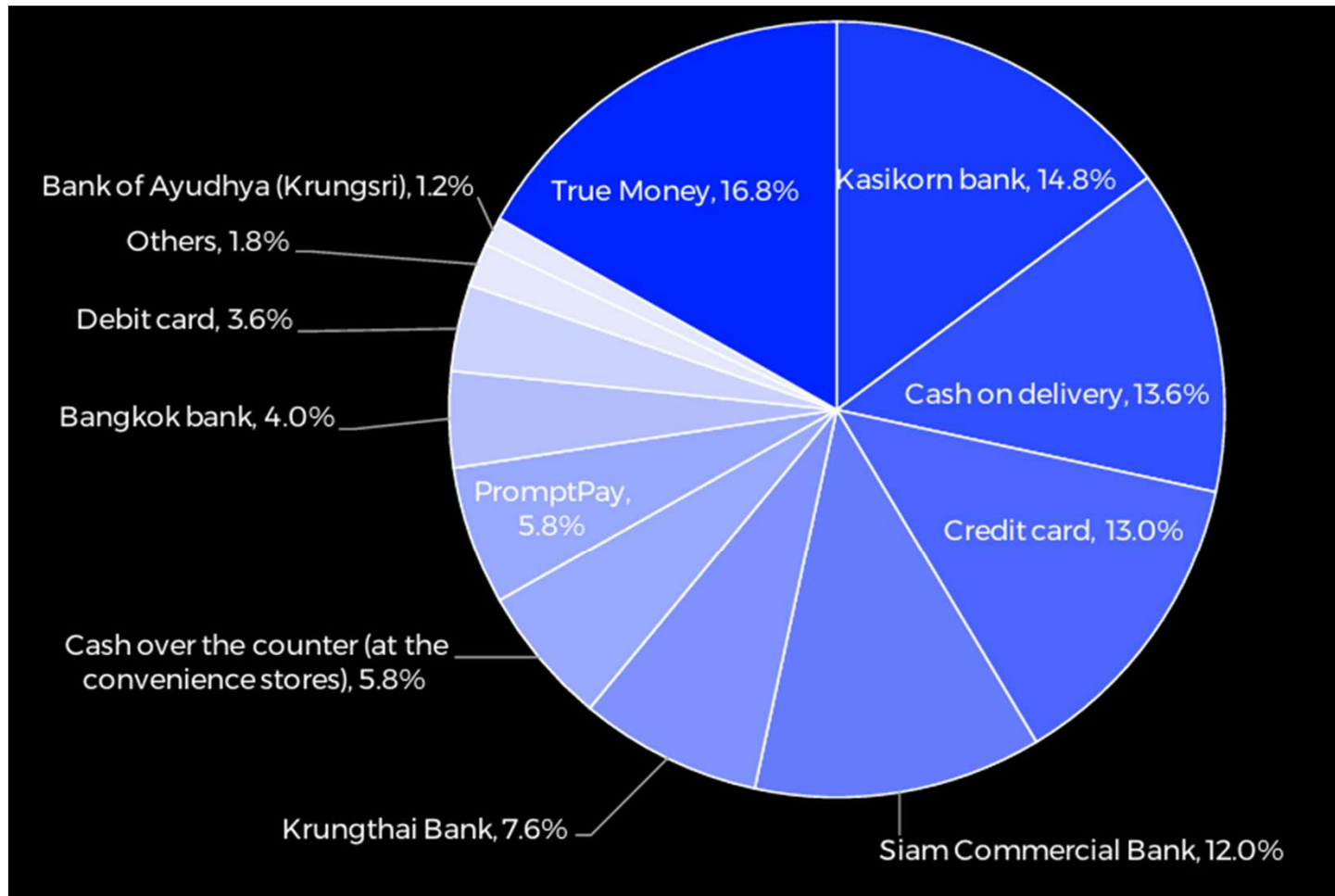
May I ask your preferred Payment method?



Can you please state the payment method of payment gateway you use

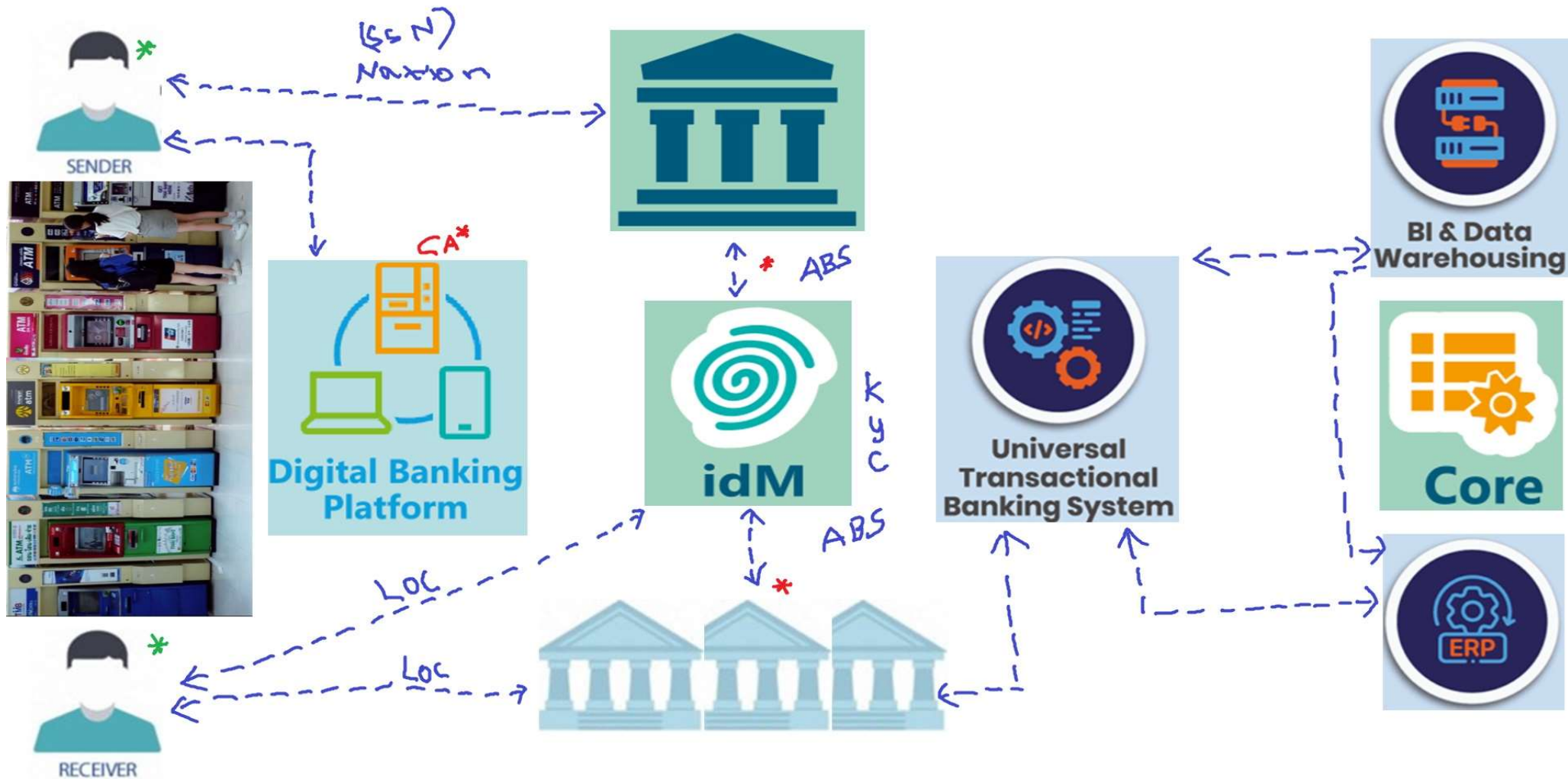
- I use **credit card** for
Journal/Conferences/Flight tickets
- Food, Scan **QR code – K Bank/SCB**
- Tea/Parking **cash**

CONSUMERS' PREFERRED PAYMENT METHODS IN THAILAND

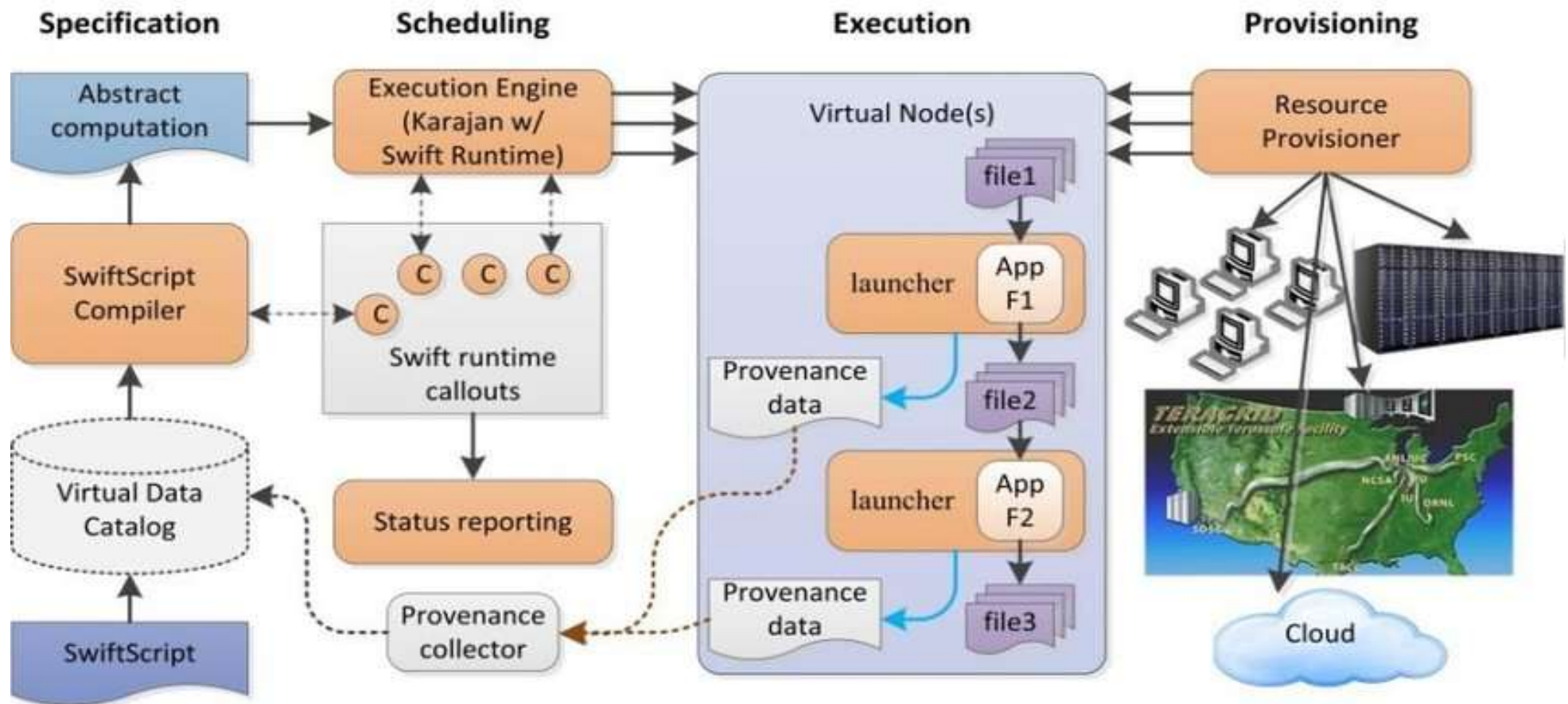


For you professors?

Basic chart/diagram for understanding Digital Payments



SWIFT - Society for Worldwide Interbank Financial Telecommunications



Understanding SWIFT

Swift (BIC) code

Consists of 8 to 11 characters

AAAA

Bank code

Letters only

BB

Country code

Letters only

CC

Location code

Letters and digits

DDD

Branch code

Letters and digits

Global Commerce to Digital Startups

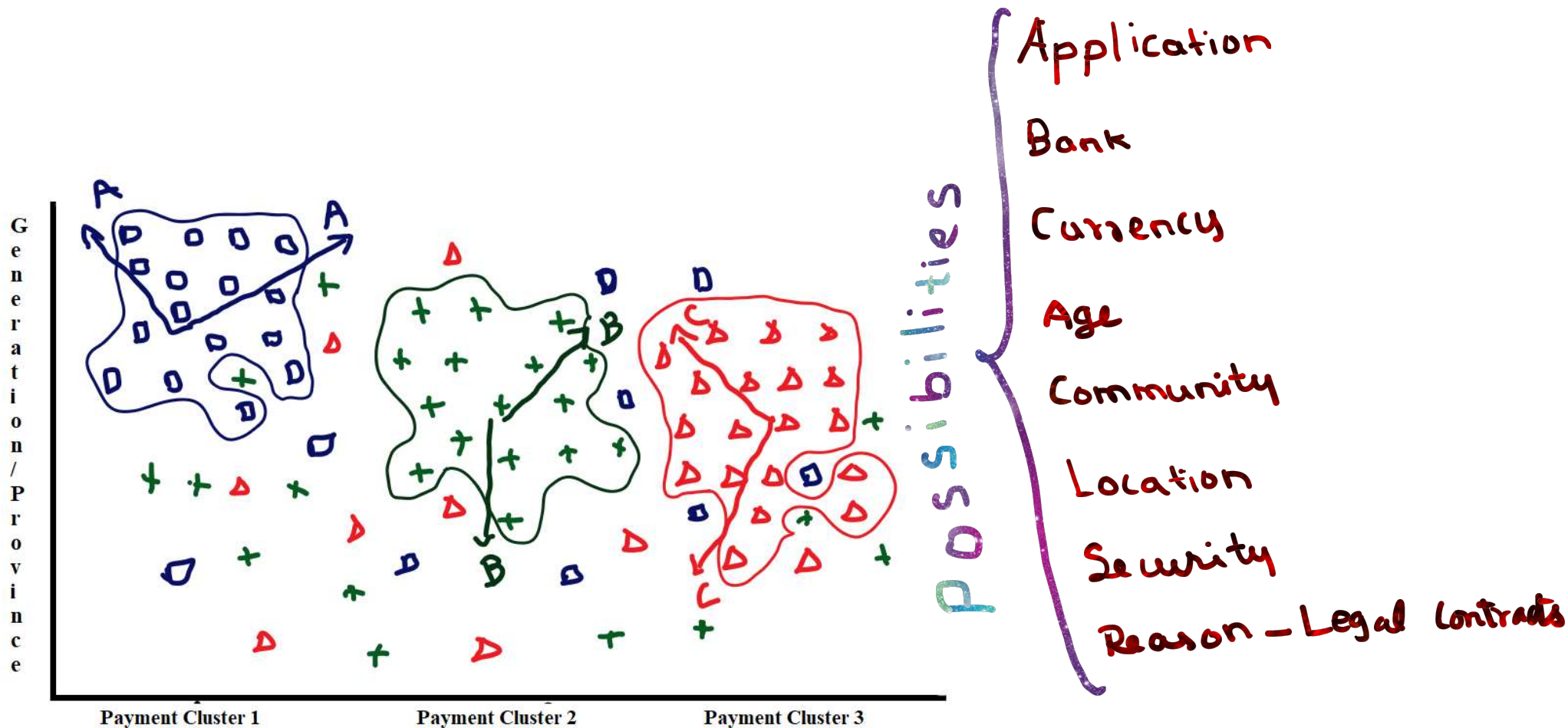


@Modified from Azhari – 2014

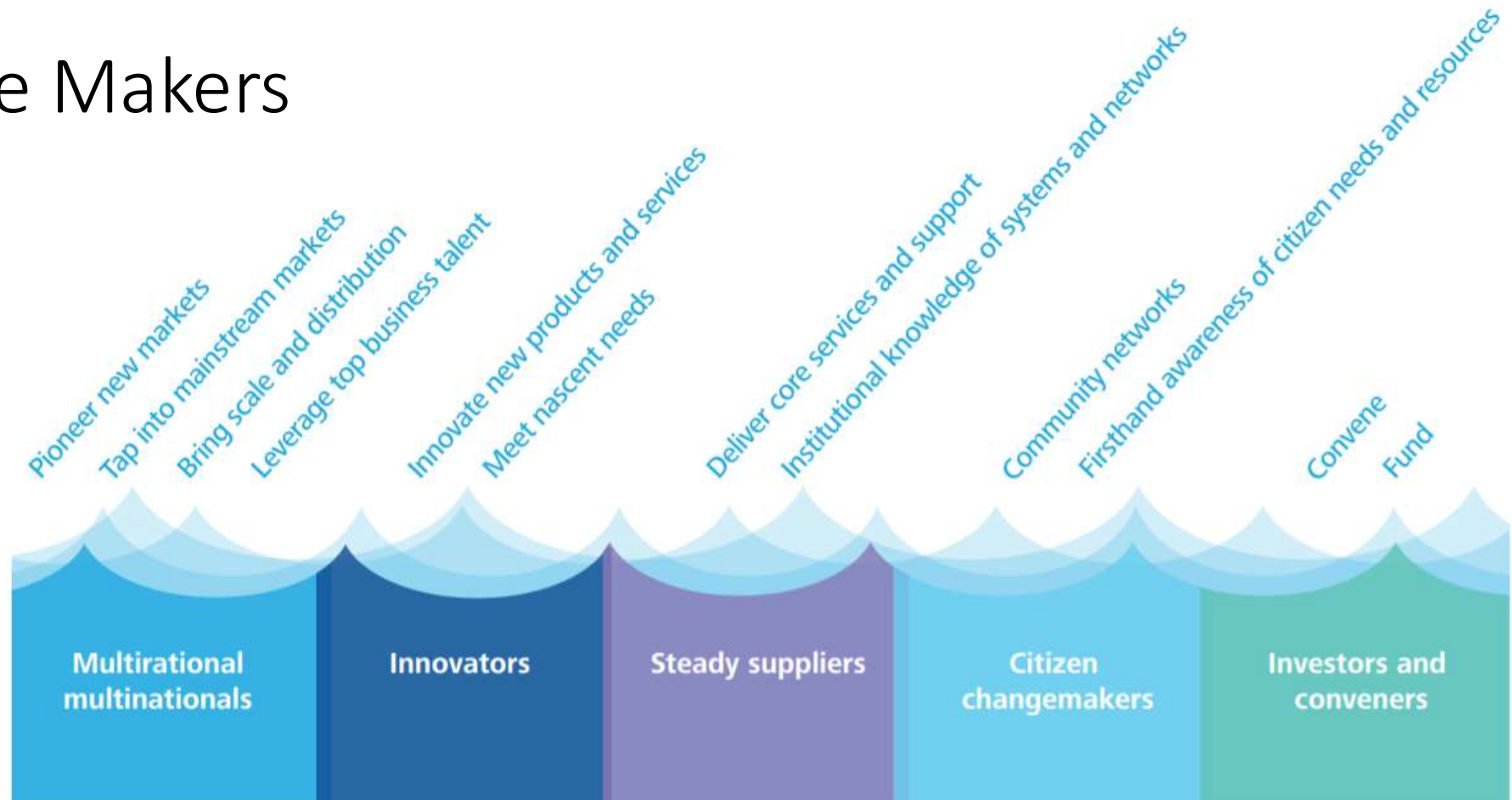
Types of possible E-commerce Startups



Digital Payment - Cluster Understanding



Wave Makers



Source: William D. Eggers and Paul Macmillan, *The Solution Revolution: How Business, Government, and Social Enterprises Are Solving Society's Toughest Problems* (Harvard Business Review Press: Boston, 2013).

Graphic: Deloitte University Press | DUPress.com

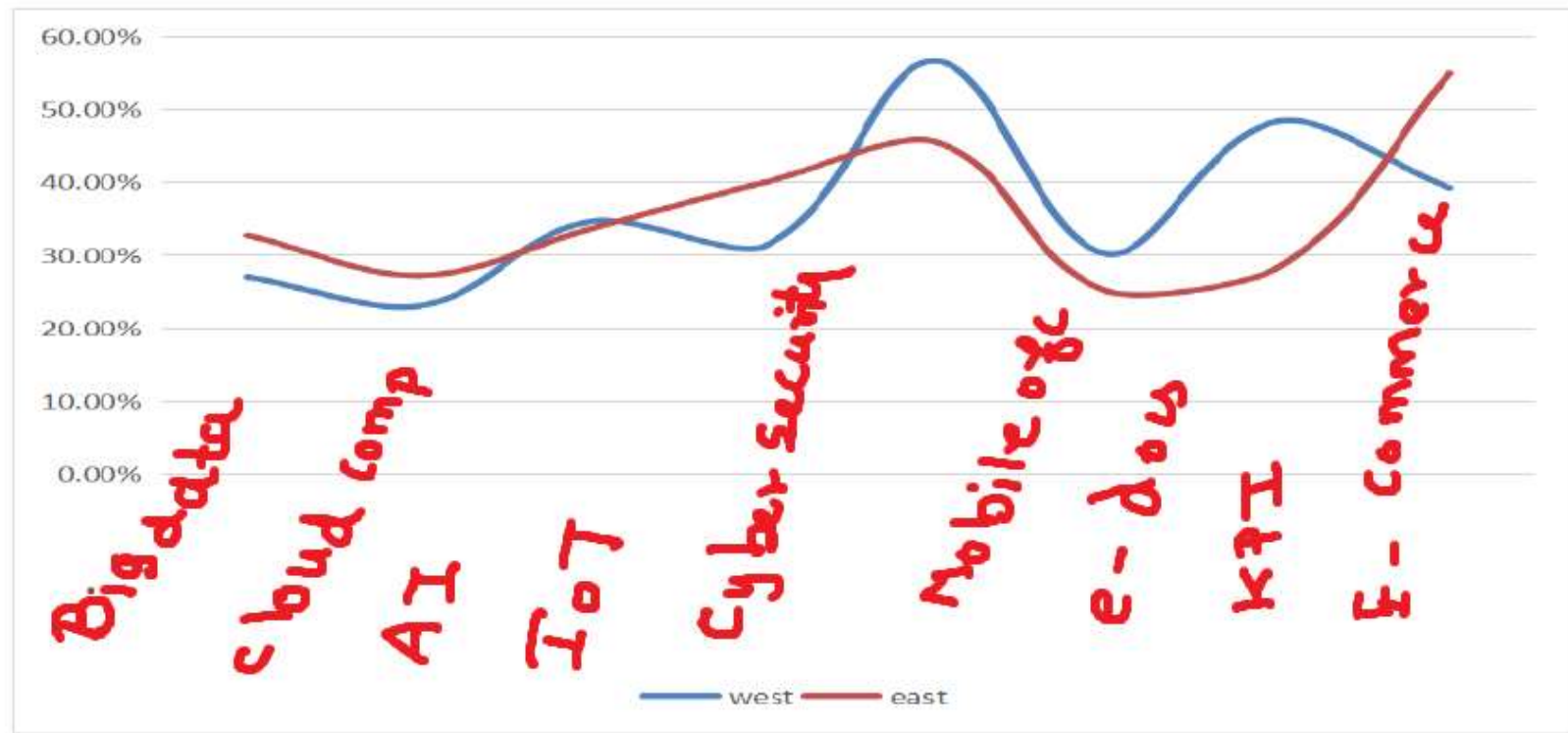
Table : Local Digital payment Service Providers in Cambodia

Platform	Description / Available Features
Bakong & KHQR Payment by National Bank of Cambodia	KHQR is a Unified QR code system created for retail payments in the Kingdom and cross-border payments as well. This has been very important player in enabling access to the unbanked as well as promoting financial inclusion through interbank transfer and payment using its unified QR code called KHQR.
ABA Mobile/Pay Way	Leading digital payment service provider and widely accepted across the city and provinces in Cambodia. There's a rapid growth in the acceptance of this payment as it is also a member of KHQR as well. It provides payment service to diverse institutions and firm both government and private, including tax payment, public services, utilities, internet and TV, real estate, insurance, education, entertainment, charity and donation, travel and tours, membership and subscription and more.
ACLEDA Mobile	One of the most mature payment service providers in the country for retail payments and is also a member of KHQR. On this app, consumer can share bill, make bill payment (Water Supply, Electricity, Solid Waste, Financial, Mobile Operator, Internet & TV, School, Insurance, Agriculture, Real Estate, Bill24, Public Services, Trading & Distribution, etc.), charity & donation, payment from partners' app/web.
Wing Money	Transformed from a simple money transfer firm to mobile payment provider with various services like account-to-account transfer, payroll service, charity and other utility bill payments.

Table : Local Digital payment Service Providers in Cambodia

Platform	Description / Available Features
True Money	Bill payment, retail payment, money transfer, payroll, started implemented by the government like paying the fine for traffic rule violations.
Pi Pay	Mobile wallet that provides retail payment and money transfer services with mobile phone top-up, pay utility and internet bills or settle insurance premiums bills.
Sathapana Mobile	Locally owned, with various features including money transfers, cross-border payment and also a member of KHQR.
Maybank QR	Retail payment and transfer within and inter-bank with a support of KHQR
Vatanak Mobile, Woori Bank Mobile, JTrust Royal,	All of these 3 also provide mobile banking service with working towards integration with utility services providers and be a member of KHQR.

% of Digital Technologies the Firms are utilizing



West of the world Vs East

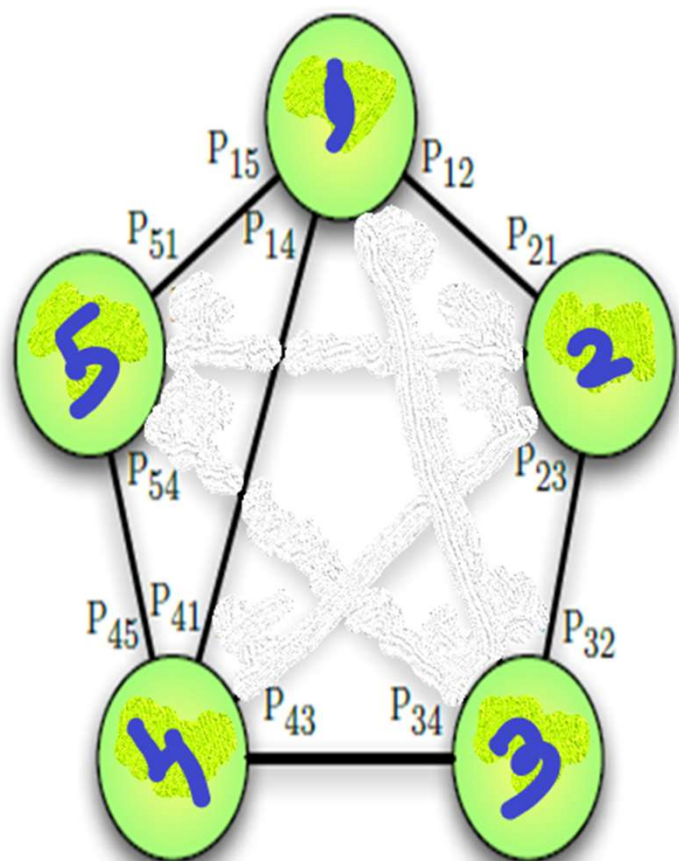
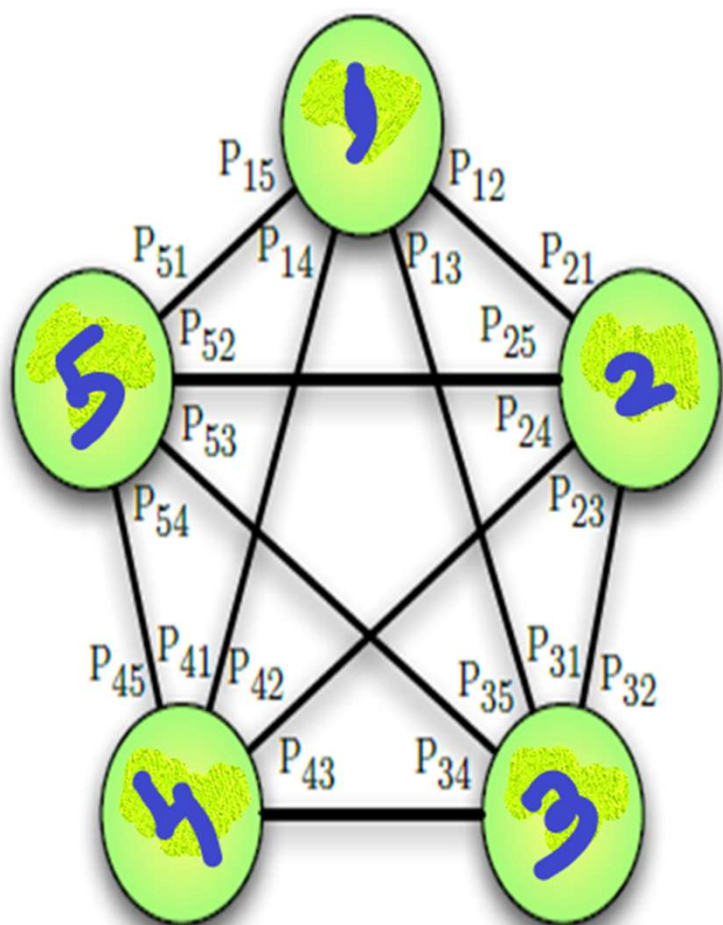
ASIAN Countries [Chiang Mai as Centroid]

- **China** : exceeding \$3 trillion *
- **Japan** : \$193 billion *
- **South Korea**: \$147 billion *
- **India**: \$119 billion *
- **Indonesia**: \$97 billion *
- Philippines, Indonesia, Malaysia, Thailand, and Vietnam Combined \$ 140 billion [Approx*]

Largest population centres of East Asia			
Rank	City name	Country	Pop.
1	Tokyo	Japan	38,140,000
2	Seoul	South Korea	25,520,000
3	Shanghai	China	24,484,000
4	Beijing	China	21,240,000
5	Osaka	Japan	20,337,000
6	Chongqing	China	13,744,000
7	Guangzhou	China	13,070,000
8	Tianjin	China	11,558,000
9	Shenzhen	China	10,828,000
10	Chengdu	China	10,104,000

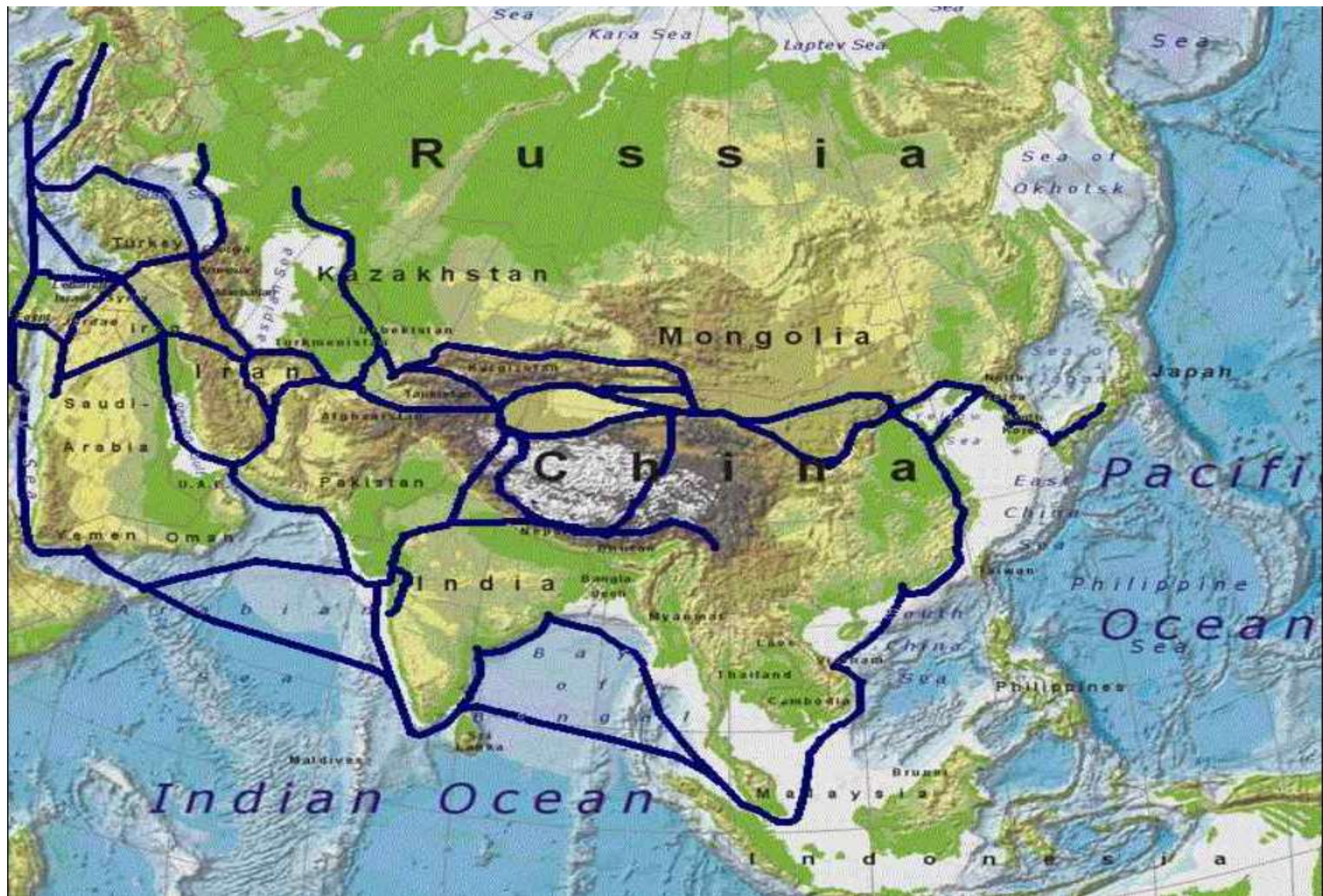
Rank ↕	Urban Area ↕	State/Province ↕	Country ↕	Population ^[208] ↕	Area (km ²) ^[208] ↕	Density (/km ²) ^[208] ↕
1	Delhi	National Capital Region	 India	29,617,000	2,232	13,266
2	Mumbai	Maharashtra	 India	23,355,000	944	24,773
3	Kolkata	West Bengal	 India	17,560,000	1,351	12,988
4	Dhaka	Dhaka Division	 Bangladesh	21,741,000	2161.17	10,060
5	Karachi	Sindh	 Pakistan	14,835,000	1,044	14,213
6	Bangalore	Karnataka	 India	13,707,000	1,205	11,381
7	Chennai	Tamil Nadu	 India	11,324,000	1,049	10,795
8	Lahore	Punjab	 Pakistan	11,021,000	853	12,934

State	Area (km ²)	Population (2020) ^[17]	Density (/km ²)	GDP (nominal), USD (2020) ^[4]	Capital
 Brunei	5,765 ^[18]	437,479	74	12,003,000,000	Bandar Seri Begawan
 Cambodia	181,035 ^[19]	16,718,965	90	25,192,000,000	Phnom Penh
 East Timor	14,874 ^[20]	1,267,974	85	1,777,000,000	Dili
 Indonesia	1,904,569 ^[21]	267,670,543	141	1,059,638,000,000	Jakarta
 Laos	236,800 ^[22]	7,061,507	30	18,820,000,000	Vientiane
 Malaysia	329,847 ^[23]	31,528,033	96	337,008,000,000	Kuala Lumpur *
 Myanmar	676,578 ^[24]	53,708,320	79	81,257,000,000	Nay Pyi Taw
 Philippines	300,000 ^[25]	106,651,394	356	361,489,000,000	Manila
 Singapore	719.2 ^[26]	5,757,499	8,005	339,981,000,000	Singapore
 Thailand	513,120 ^[27]	69,428,453	135	501,712,000,000	Bangkok
 Vietnam	331,210 ^[28]	95,545,962	288	343,114,000,000	Hanoi



Leader's win again in ASIA's elections





References:

- 1. <https://www.bangkokpost.com/tech/1803754/thais-setting-the-pace-for-social-commerce>
- 2. <https://www.jpmorgan.com/merchant-services/insights/reports/thailand>
- 3. https://en.wikipedia.org/wiki/List_of_countries_by_number_of_Internet_users
- 4. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=TH>
- 5. <https://www.export.gov/article?id=Thailand-ecommerce>
- 6. <https://www.statista.com/statistics/950322/thailand-share-credit-card-holders/>
- 7. Leang, P., Ramsamy, S. S., Phaphuangwittayakul, A., & Loahavilai, P.- or. (2023). Consumer Perceptions and Behaviors on Digital Payment Adoption Among Older Generation Z and Younger Millennials in Phnom Penh, Cambodia. *International Journal of Professional Business Review*, 8(8), e03647. <https://doi.org/10.26668/businessreview/2023.v8i8.3647>

Please ask me any question!

Let me try to listen and tell you **answer**
after having a coffee from you, ICDI Team



ICDI International College of
DIGITAL INNOVATION
CHIANG MAI UNIVERSITY

This is the future we want

Dr Michael Harris
International College of Digital Innovation
Chiang Mai University

Introduction

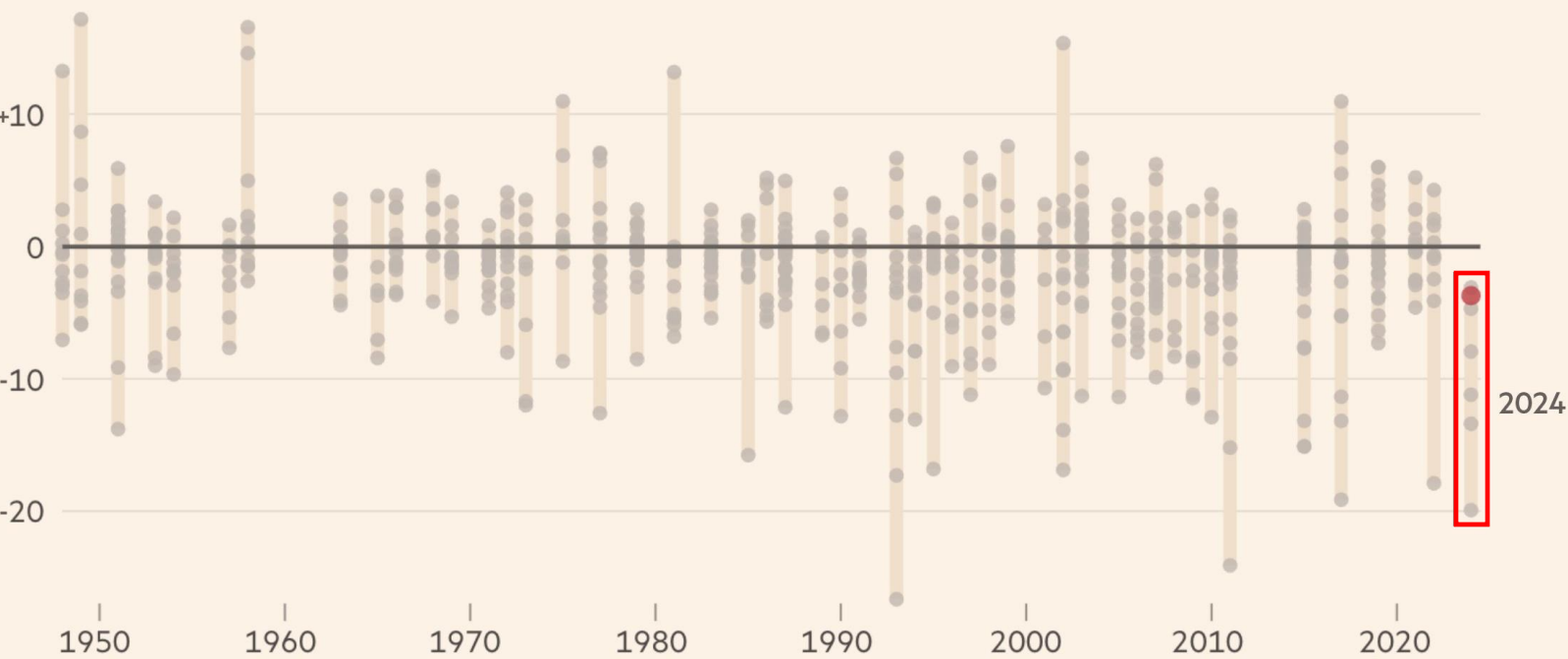
This presentation discusses a different way of thinking about how people feel about the future, based on whether they are optimistic or fearful about technological and social change. So, we can divide people into four quadrants - what we can call Techno-accelerationists, Small 'c' conservatives, fully automated luxury communists, and Solarpunks. Describing possible futures using tools and techniques from strategic foresight can also help us think about these futures in more detailed ways.



Every governing party facing election in a developed country this year lost vote share, the first time this has ever happened

Rise/fall in vote share for governing parties in national elections (% pts), by year

● Individual election ● US 2024



Excludes years where fewer than five countries had elections

FT graphic: John Burn-Murdoch / @jburnmurdoch

Sources: [ParlGov](#), FT research

©FT



- This is the typical way in many countries that we think about where people are on a political spectrum...

Liberal

Center

Conservative

- ...but this probably no longer works in an age of rapid technological and social change



But who is the **'we'** here?

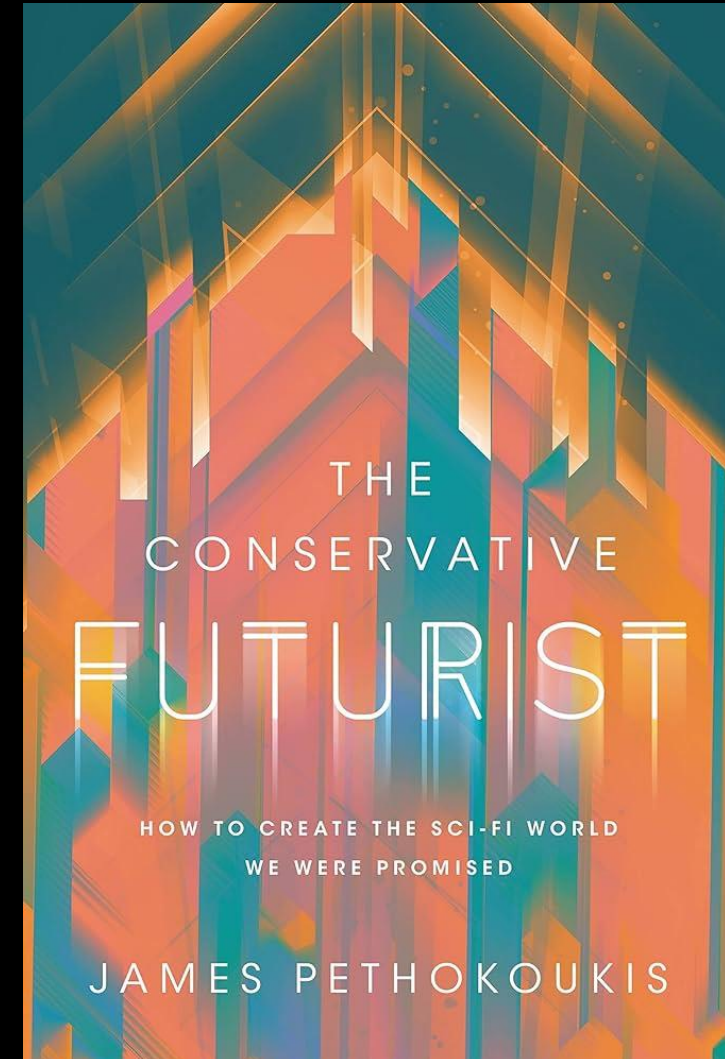


Negative visions of the future





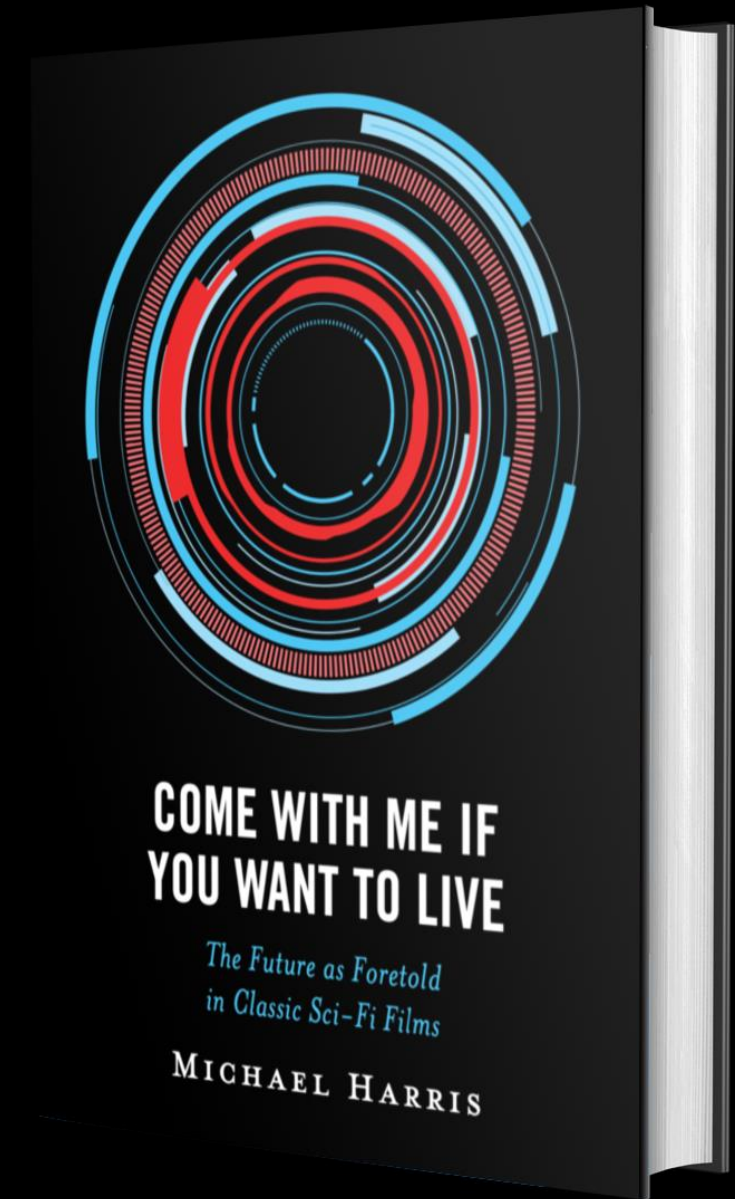
“But as we moved into the late 20th century, we grew cautious, even cynical, about what the future held and our ability to shape it. Too many of us saw only the threats from rapid change. The year 2023 marks the 50th anniversary of the start of the Great Downshift in technological progress and economic growth, followed by decades of economic stagnation, downsized dreams, and a popular culture fixated on catastrophe: AI that will take all our jobs if it doesn’t kill us first, nuclear war, climate chaos, plague and the zombie apocalypse. We are now at risk of another half-century of making the same mistakes and pushing a pro-progress future into the realm of impossibility.”





"It's not a failing of creators' imaginations (let alone a conspiracy of despair) that we're stuck in dystopian visions of the future - it's that politically, economically, and socially we've essentially been stuck on the same trajectory towards futures that are decidedly dystopian."

Moreover, the fears expressed in some 1970s sci-fi have turned from predictions into descriptions — not because we heeded their concerns, but because we didn't. This is the world that sci-fi 'promised' us, not a future of flying cars."







Liberal

Center

Conservative

- So, let's replace this way of understanding of where people are on a political spectrum with a new schema – one based on **how they think and feel about the future...**



'Techno-accelerationists'



The Techno-Optimist Manifesto

Marc Andreessen

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TABLE OF CONTENTS

Lies

Truth

Technology

Markets

The Techno-Capital Machine

Intelligence

Energy

Abundance

Not Utopia, But Close Enough

Becoming Technological Supermen

Posted October 16, 2023



You live in a deranged age — more deranged than usual, because despite great scientific and technological advances, man has not the faintest idea of who he is or what he is doing.

Walker Percy

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The 'autonomous economy'

Four steps in the evolution of the machine-to-machine economy

1. Right now

Machines are becoming instrumented, with sensors, self-monitoring tools and communication capabilities. From toothbrushes and fridges to cars and tractors, our everyday tools are all becoming smart, and connected.



4. Machines as customers

Machines will become increasingly autonomous market participants, and will become financial actors in their own right, with their own bank accounts and payment systems. These machines that we've built to support us will free us up to do more things that we're passionate about.

2. Machines that look after themselves

Self-monitoring machines will become capable of ordering services like maintenance, arranging their own insurance and making decisions with the trust of their owners. Those services will initially be performed with humans, side by side, but will increasingly be supplied to machines by other machines.



3. Services instead of assets

Businesses will move away from buying machines outright and instead we'll see the 'Uberisation' of businesses with self-managed assets sharing their services in a decentralised ecosystem. Machine subscription models and real-time leasing will be prevalent.



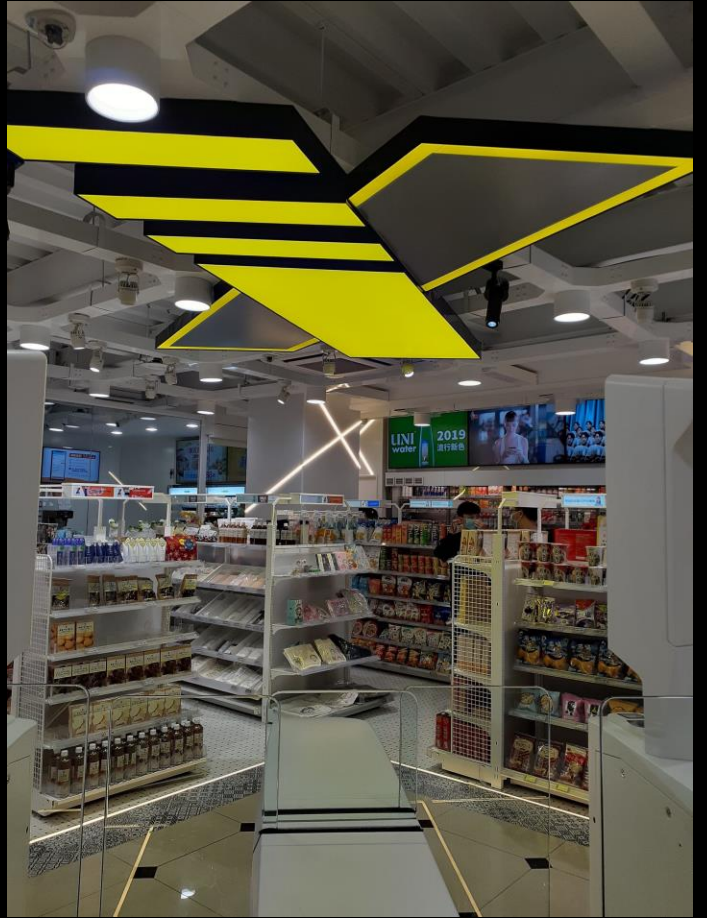
Welcoming
the machine-
to-machine
economy



But, a jobs 'apocalypse'?

- A widely-cited 2013 study of more than 700 occupations by researchers at the University of Oxford found that **47 percent of all jobs in the US (more than 60 million jobs) are at risk of being fully automated over the next 20 years** (Carl Frey Benedikt and Michael A. Osborne, *From Brawn to Brains: The Impact of Technology on Jobs in the UK*, 2015)
- Globally, by 2030 between **400 million and 800 million people could need to find new jobs as a result of automation**
- A study using the same methodology found that **between 50 and 60 percent of jobs in most European countries could be taken over by robots or algorithms** (Jeremy Bowles, Chart of the Week: 54% of EU Jobs at Risk of Computerisation, 2014; McKinsey Global Institute, *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation*, 2017)







DEVELOPED COUNTRIES LACK ECONOMIC OPTIMISM

Percent who believe they and their families will be better off in five years' time

■ Developed countries

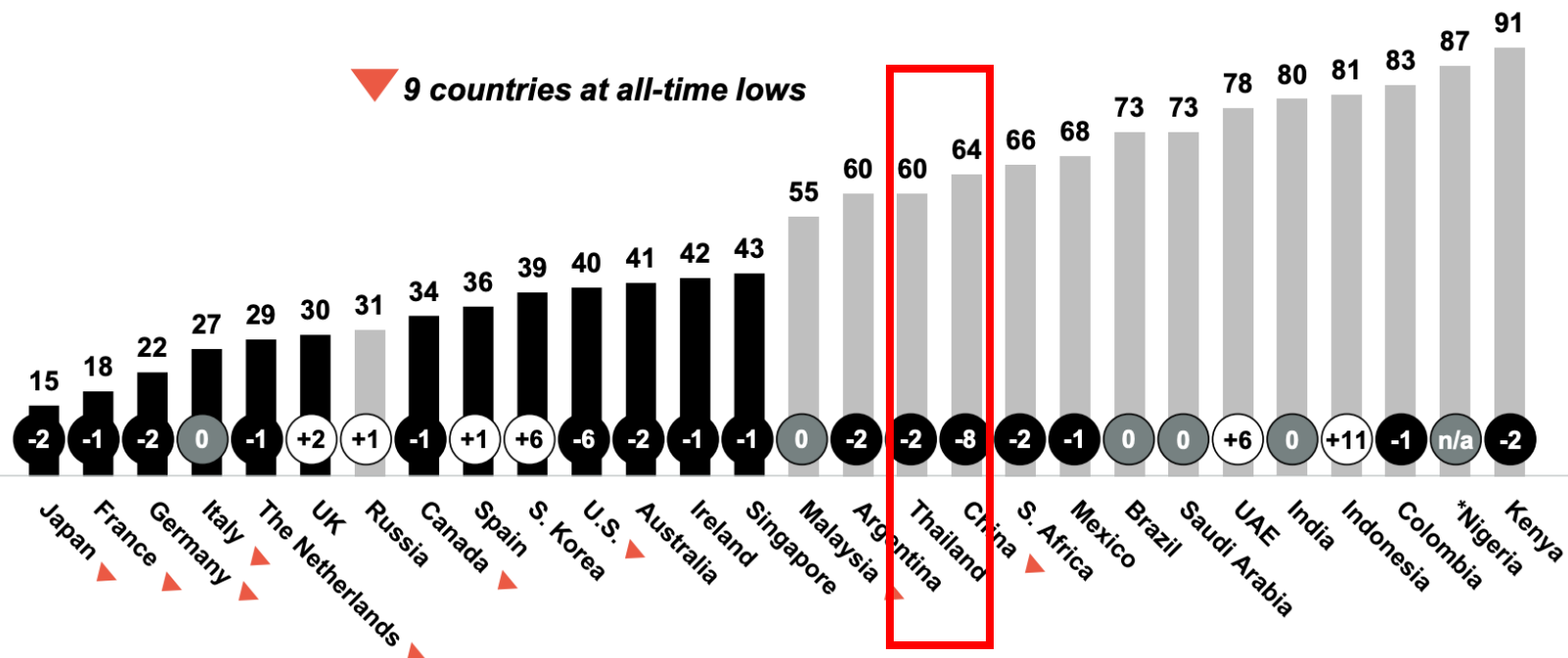
● 0 ● + Change, 2021 to 2022

My family and I will be better off
in five years' time

Global 27

51%
0 pts

▼ 9 countries at all-time lows





Inequality in the network society

“The network society tends to become more unequal than the mass society. In principle, networks are more appropriate to exchange (im)material goods than other communication structures. In practice, they concentrate them in a few powerful hubs, clusters or portals and they have a polarizing effect on class and power divisions and job hierarchies.

...With regard to usage, a gap is appearing between those who benefit from the advanced applications to be used in job or school careers and in relationships of politics and power, and those who use the simple applications for entertainment, e-commerce and basic communications.

The network society is an unstable type of society. This is for the paradoxical reason that it is both too connected and too divided.”

– Jan van Dijk, *The Network Society*





‘Make America Great Again’

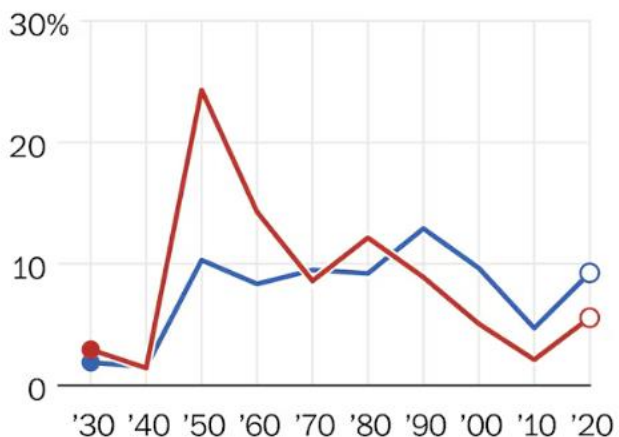


‘Take **Back** Control’

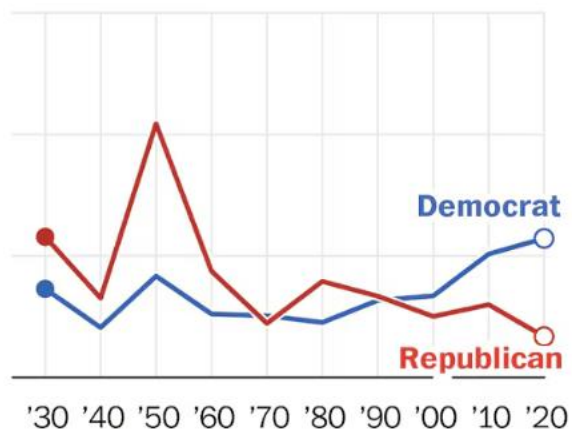


Share who said each superlative best applied to a given decade

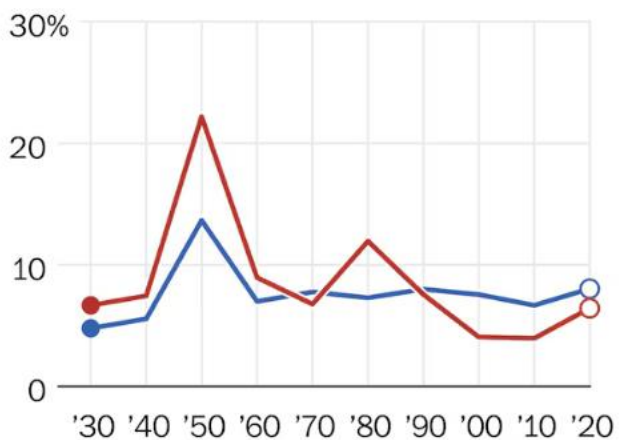
The happiest families



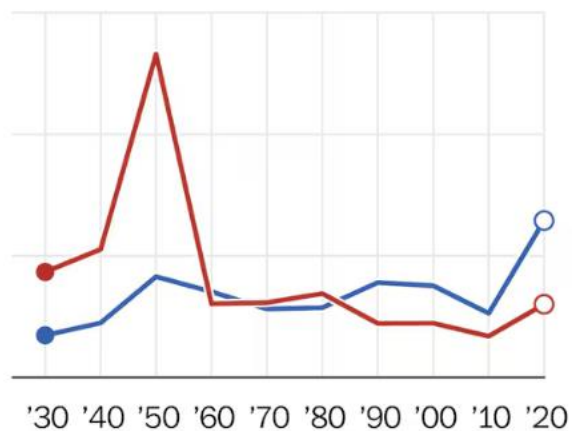
The least crime



The most close-knit communities



The most moral society





Social change

Technological change

Optimistic

Critical/
Fearful

Optimistic

Critical/Fearful

	Techno- accelerationists
	Small 'c' conservatives



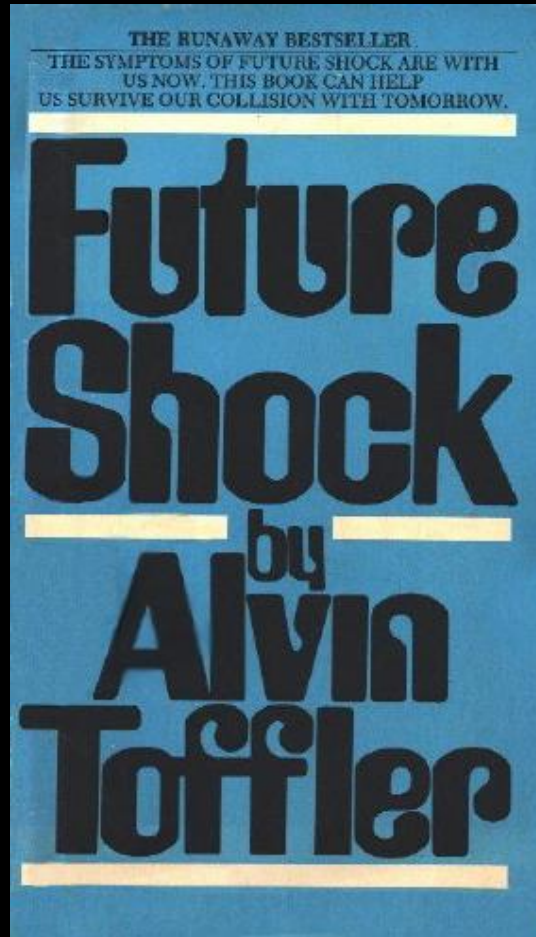
'Small 'c' conservatives'



This doesn't necessarily mean politically right-wing (socially or economically conservative)



Most people don't like change
(even if it could be positive)



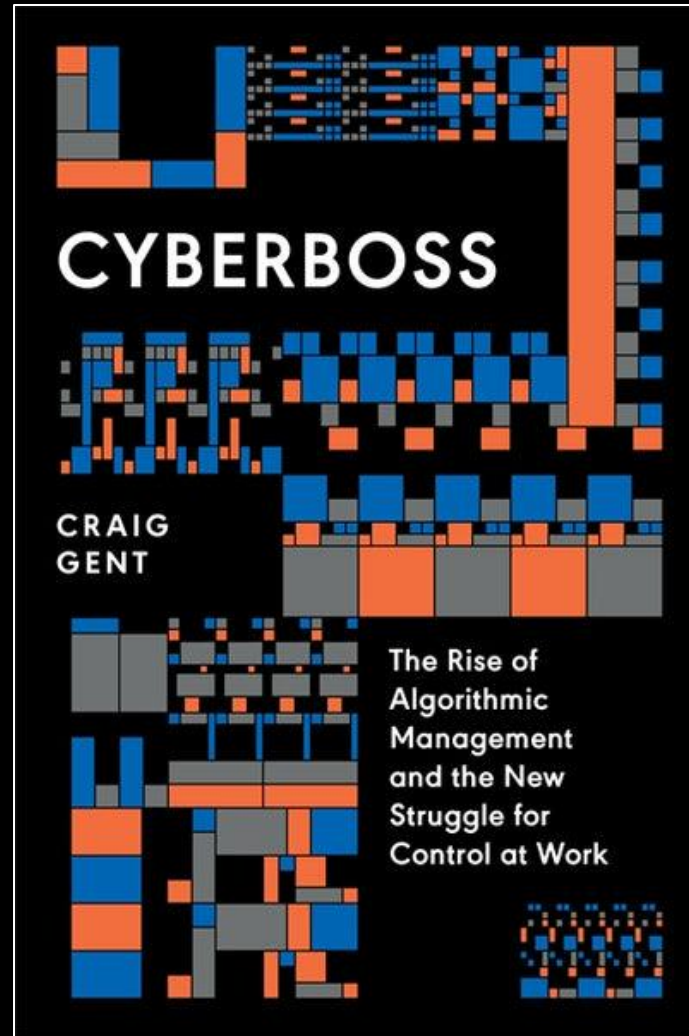
- That many people might be worried about rapid change is not new – for example, Alvin Toffler wrote about this in 1970 in his book *Future Shock*



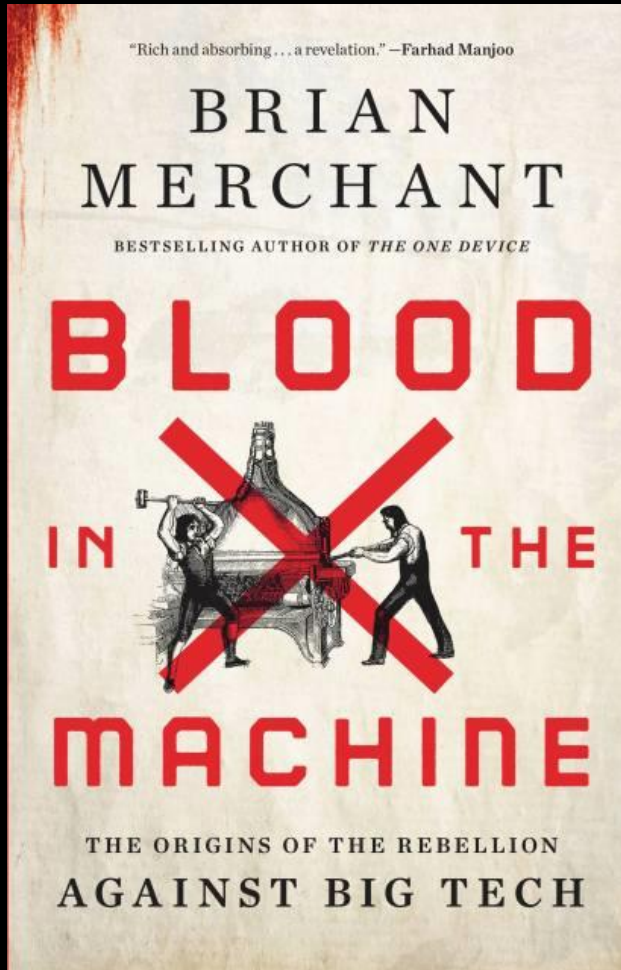
'Luddites'



- The Luddites were a group of workers in England in the early 19th century who destroyed machinery, especially in cotton and woolen mills, that they believed was threatening their jobs



- How will people react to their **working lives being managed by algorithms** (which is more likely than everyone losing their job to a machine)?



- Will we see a new generation of Luddites rebelling against new technologies such as A.I.?





Technological
change

Optimistic

Critical/
Fearful

Social change

Optimistic

Critical/Fearful

Fully automated luxury communists	Techno- accelerationists
	Small 'c' conservatives



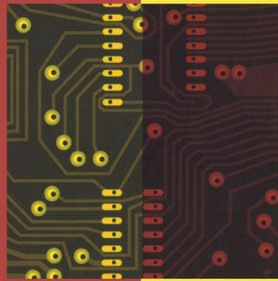
'Fully-automated luxury communism'



- An automated economy was part of the dream of Soviet computer scientists in building a 'new society' – but computing power was never good enough



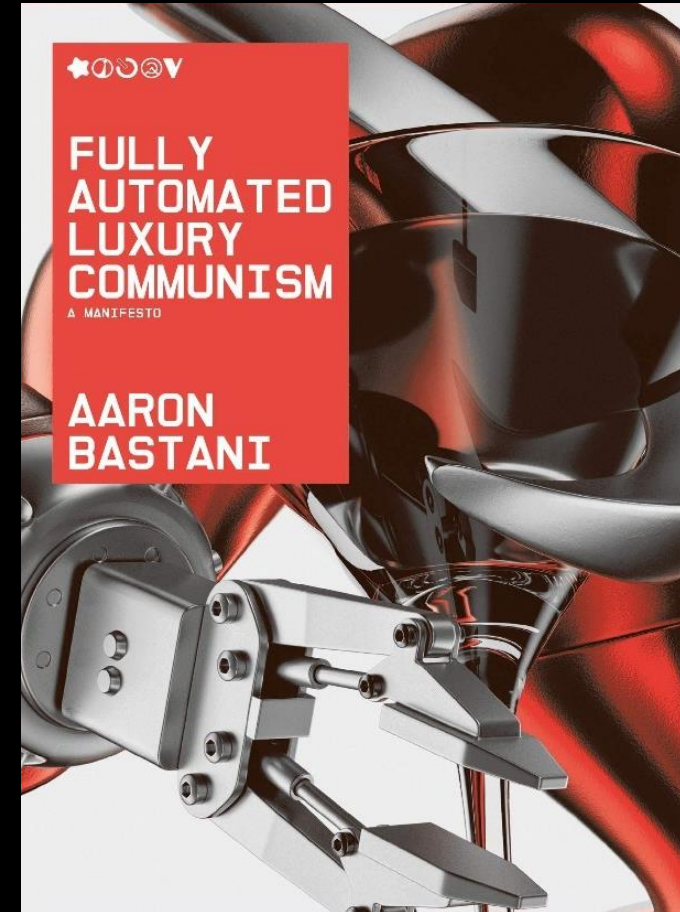
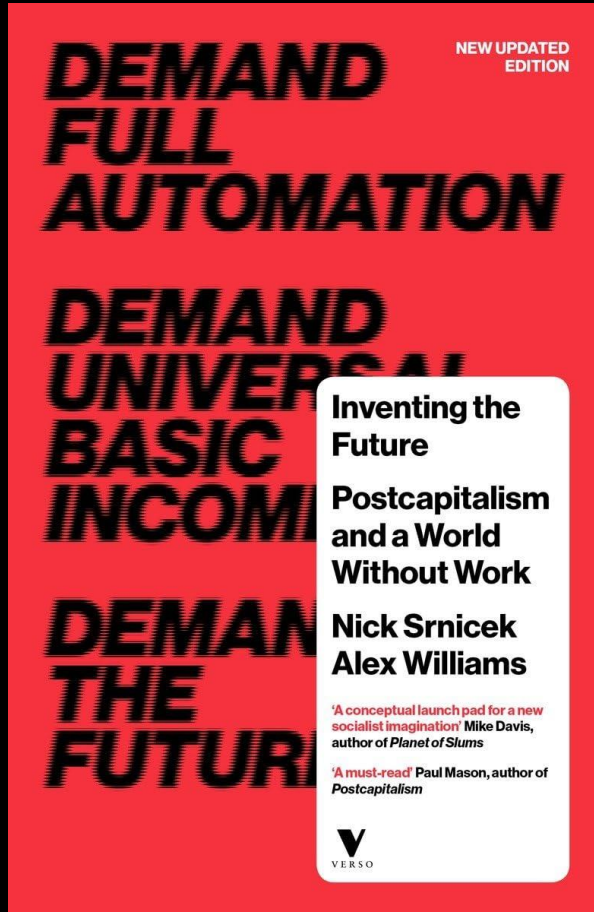
DESIGNING FREEDOM



STAFFORD
BEER



- Cybernetics also informed the Chilean government's experiments in real-time economic management under President Salvador Allende (until the CIA-backed military coup against his administration)



- But more recently, with the massive increase in computing power, some thinkers have returned to these ideas



- If this sounds fantastical, consider how companies like Amazon are effectively creating an automated economy inside their own businesses



Social change

Technological change

Optimistic

Critical/
Fearful

Optimistic

Critical/Fearful

Fully automated
luxury communists

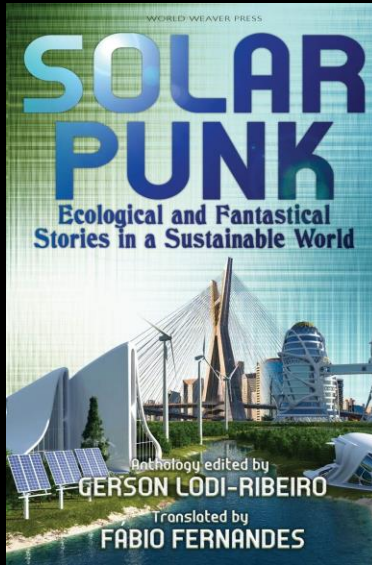
Techno-
accelerationists

Solarpunks

Small 'c'
conservatives



'Solarpunks'



- Solarpunk envisions a sustainable future connected with nature and community
- The 'solar' represents solar energy as a renewable energy source and an optimistic vision of the future that rejects climate doomerism, while the 'punk' refers to do-it-yourself and the countercultural, post-capitalist aspects of creating such a future



- This is Almere, a city just outside of Amsterdam in The Netherlands – could this be a model for Solarpunk-type communities in the future?



Technological
change

Optimistic

Critical/
Fearful

Social change

Optimistic

Critical/Fearful

Technological innovation

Fully automated
luxury communists

Techno-
accelerationists

Social innovation

Solarpunks

Small 'c'
conservatives



Perhaps the best thing we
can do is to 'surface'
possible futures – hence the
value of **Strategic Foresight**



Strategic foresight

- ‘Strategic foresight’ is based on **critical thinking about long-term developments and a positive view on shaping the future**
- Similarly, it has been said that “Foresight is the systematic debate of complex futures”
- Strategic foresight is **not about making predictions** based on current trends (‘the future will definitely be like this’)
- Rather, its value lies in **developing multiple scenarios which recognise the complexity and unpredictability of the forces shaping the future**, and then how we might avoid or mitigate the most negative scenarios, and exploit and enhance the most positive scenarios



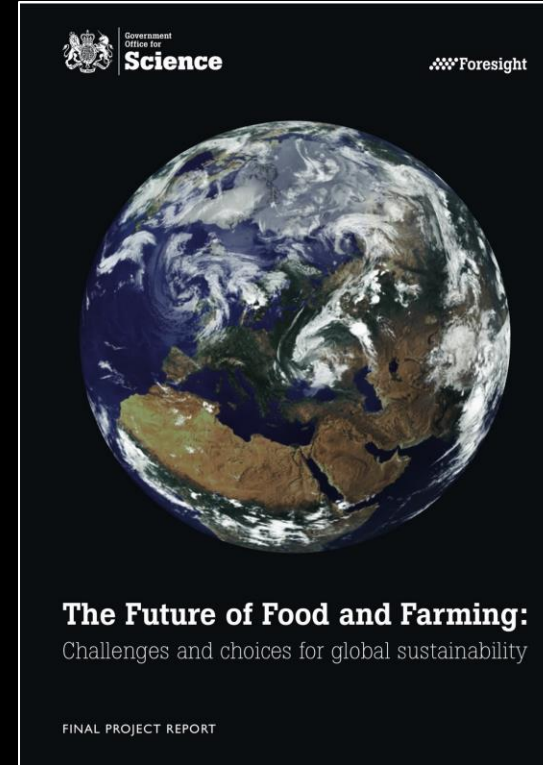
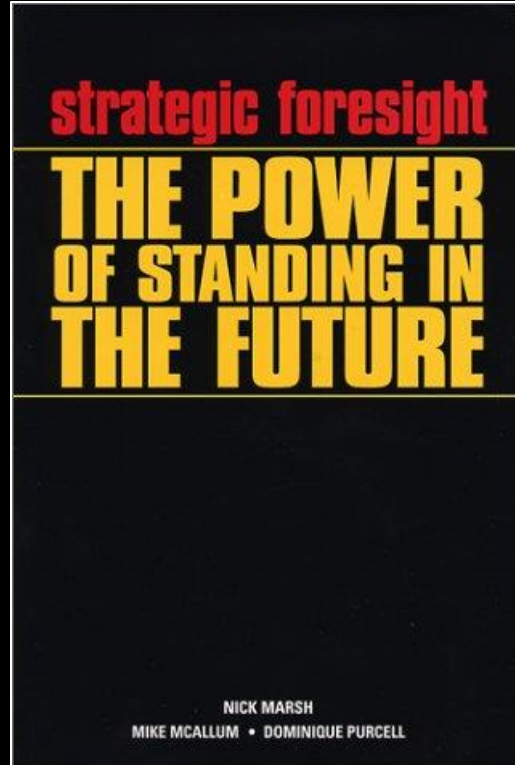
Strategic foresight



- Strategic foresight is widely used in businesses and sectors in which product development and lifecycles are very long – for obvious reasons



Strategic foresight



- Foresight and scenarios date back to the 1950s and 1960s. They were especially developed in military and business circles to inform strategy and anticipate risks, from war gaming to emergency planning



Strategic foresight

[RSPCA](#) [Shop](#) [Next Gen](#) [Education](#) [Colour mode](#) [Vivid](#)

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[← Latest](#)

Animal Futures

Animals' futures are in our hands. Will we build a world which treats them with kindness and respect, or leave them behind as we put our own needs first? Explore five different futures and uncover how your choices today will impact animals' lives.

[Explore Animal Futures](#)

<https://www.rspca.org.uk/webContent/animalfutures/>



(and science fiction is also a
type of strategic foresight)



So, is this schema useful...?



...and where would you
place yourself in it?



Technological
change

Optimistic

Critical/
Fearful

Social change

Optimistic

Critical/Fearful

Introduction to **Complex Network** and its Applications

Aniwat Phaphuangwittayakul

International College of Digital Innovation

Introduction

Complex networks represent intricate systems composed of nodes (vertices) connected by edges (links) that exhibit non-trivial topological features beyond simple random graphs. These networks are ubiquitous across various domains, including social interactions, biological systems, technological infrastructures, and more. At their core, complex networks consist of basic components: nodes representing entities and edges representing connections or relationships between these entities. What makes these networks fascinating is their ability to reveal complex interactions and patterns that are not immediately apparent in traditional network models. From social platforms like Facebook and Twitter to biological networks such as protein interactions and neural connections, complex networks provide profound insights into system behaviors. Researchers focus on key objectives like identifying influential nodes, analyzing network structures, and optimizing network performance. Scientists can uncover critical nodes that significantly impact network dynamics by employing advanced measurement techniques such as degree centrality, closeness centrality, and betweenness centrality. The interdisciplinary nature of complex network research enables applications ranging from understanding disease spread and drug discovery to optimizing transportation networks and enhancing urban management, making it a crucial field for comprehending the intricate interconnections that define our modern world.

Do you know that...

we can potentially connect to anyone on the planet by knowing only six people?

6°

Social media networks can connect
any two people through just

Degrees of separation

(a chain of “friend of a friend”)

You

Bill Gates



OUTLINE

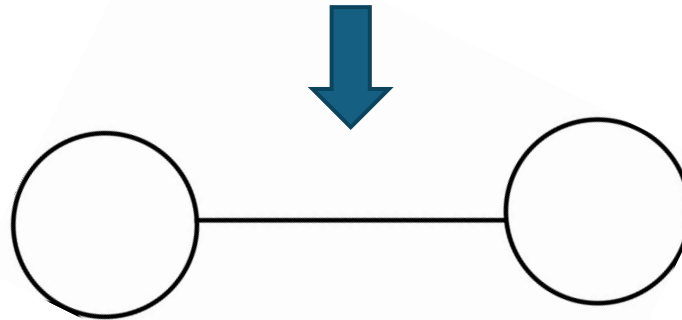


What is **Complex** **Network?**

What is **Complex Network**?

Structure composed of **nodes (or vertices)** connected by **edges (or links)**

Two vertices (nodes) connected by
a non-directed edge

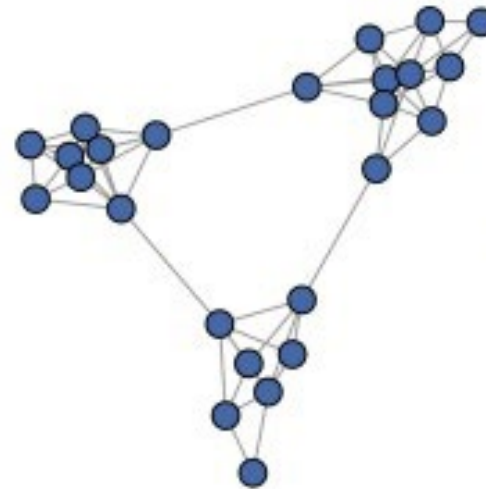


What is **Complex Network**?

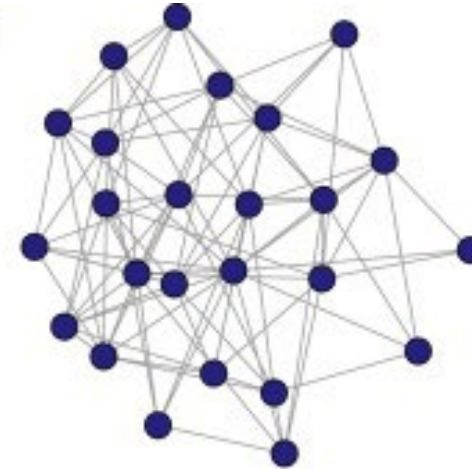
Structure composed of **nodes (or vertices)** connected by **edges (or links)** that exhibit non-trivial **topological features**.



Regular network



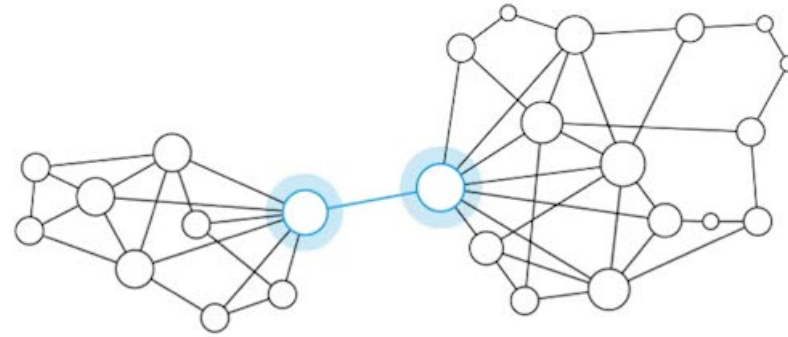
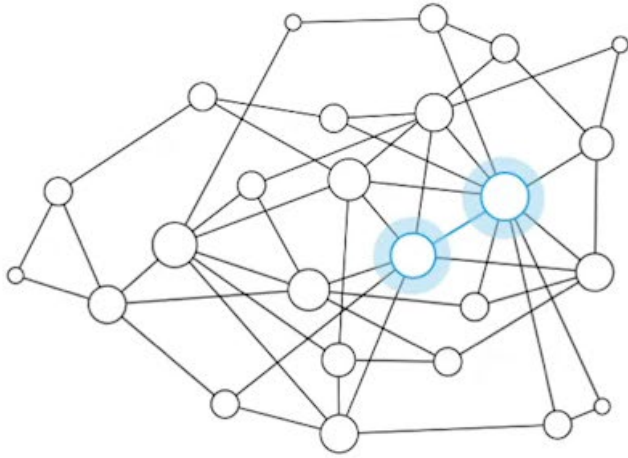
Complex network



Random network

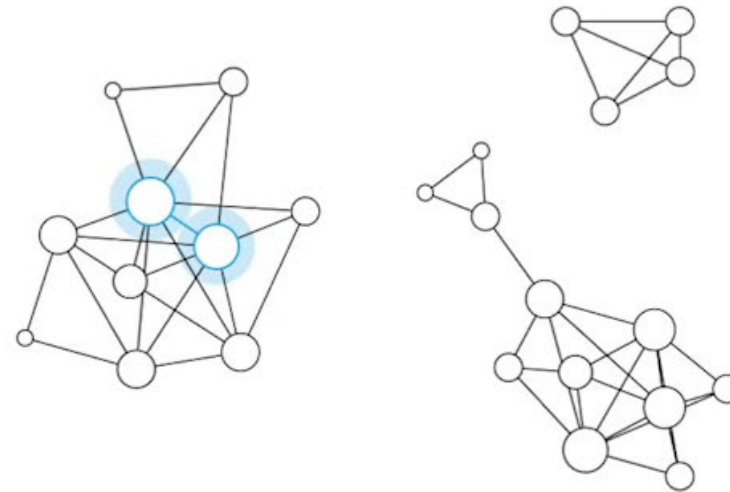
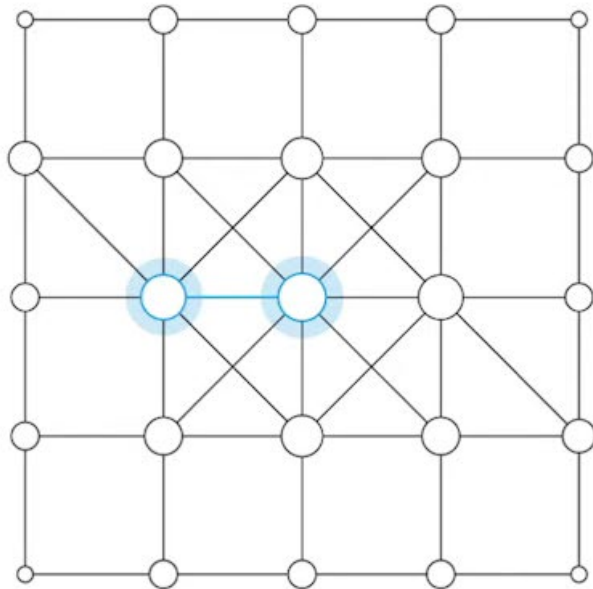
Trends in Cognitive Sciences

Source: Karuza, E. A., Thompson-Schill, S. L., & Bassett, D. S. (2016). Local patterns to global architectures: influences of network topology on human learning. *Trends in cognitive sciences*, 20(8), 629-640.



Number of vertices: **25**
 Number of edges: **50**

The same relationship in a
 different context

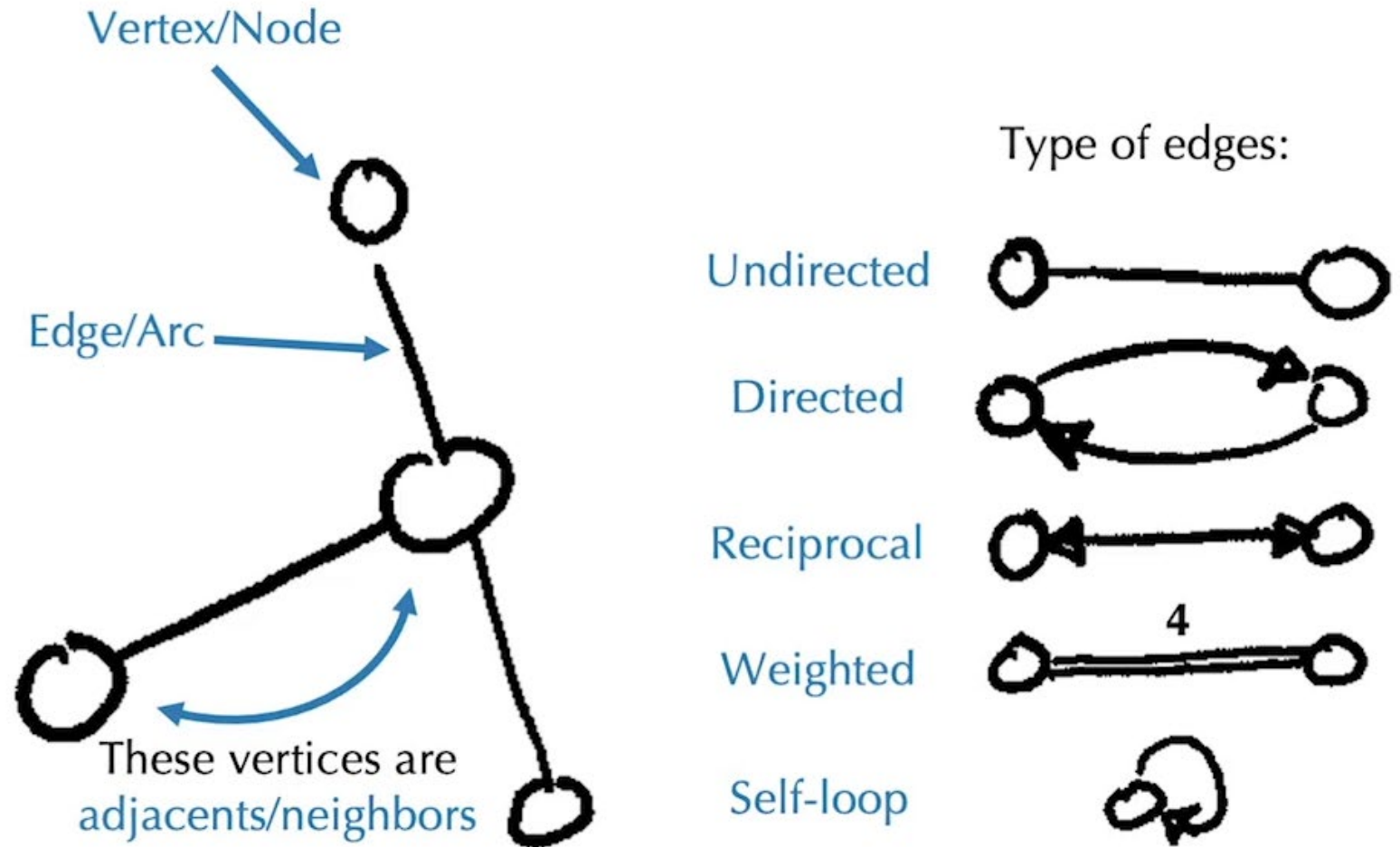


What is **Complex Network**?

Structure composed of **nodes (or vertices)** connected by **edges (or links)** that exhibit non-trivial **topological features**.

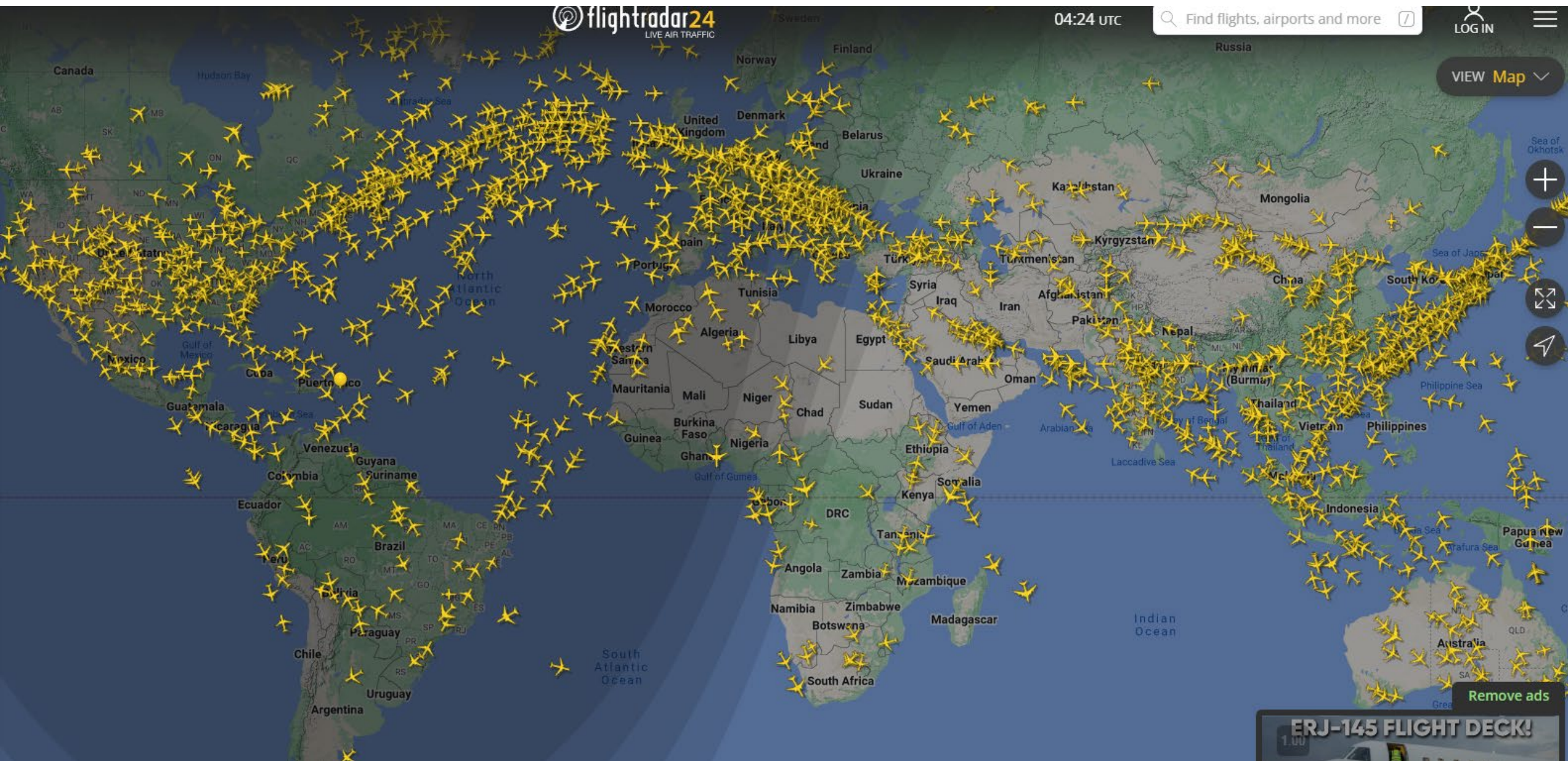
These features go beyond simple random **graphs** and often reflect the **complex nature** of real-world systems they represent.

Graph



Basic components of a network

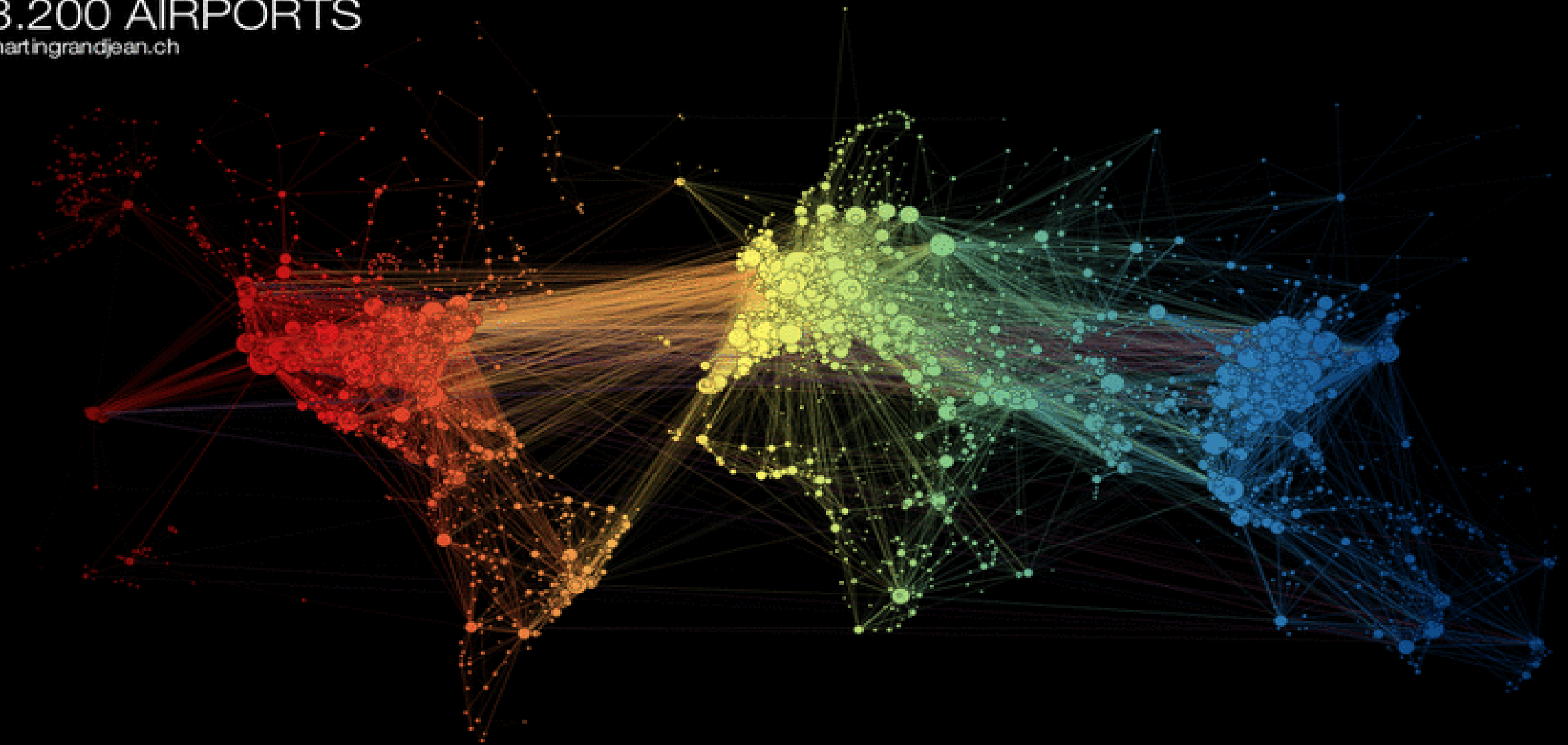
- **Nodes (Vertices) – Entities** in network
- **Edges – Connections/Relationships** between vertices



CONNECTIONS

3.200 AIRPORTS

martingrandjean.ch



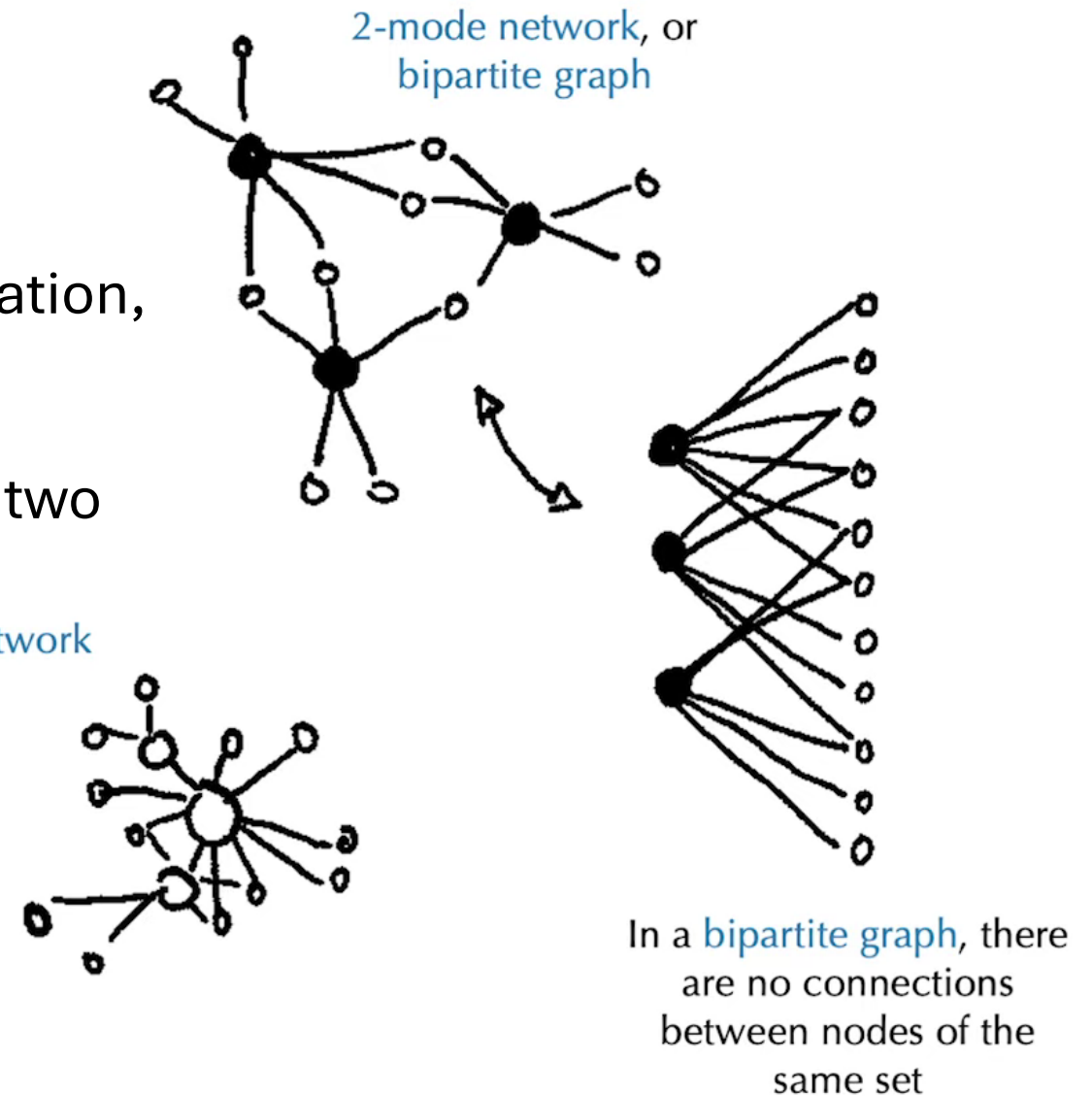
Graph

❑ 1-mode network: A single set of nodes in a network e.g., Products, People in an organization, Customers, etc.

❑ 2-mode network: The network comprises of two sets of nodes.

e.g.,

- User-product networks (Amazon, eBay, etc.)
- Membership/affiliation networks (actor-movies {IMDB}, user-group {Youtube}, user-channel {youtube}, user-project {Github}, user-organization, etc.)
- User-preference networks (Pinterest, Instagram, Twitter)
- User-stock investment



Vertices

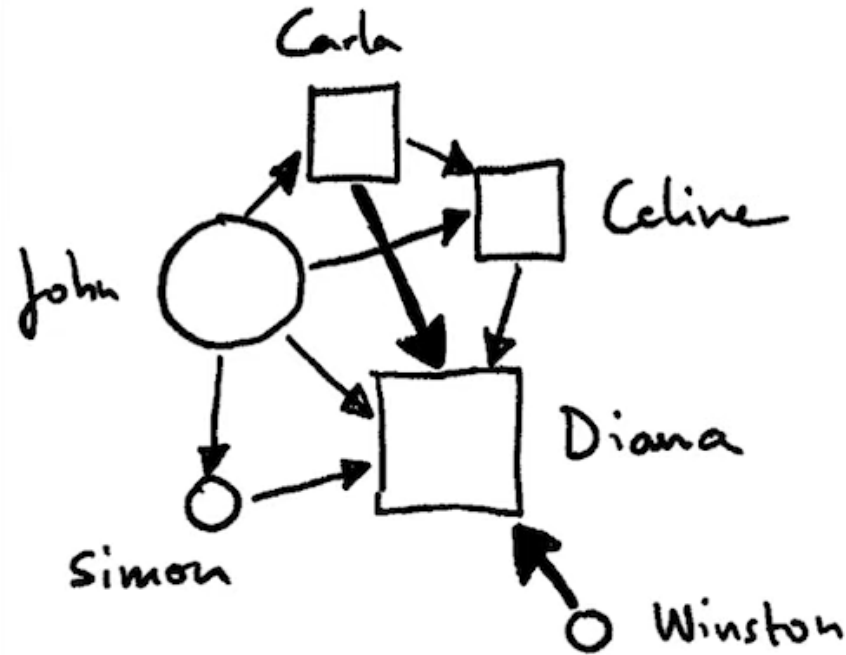
Id,Label,Attribute

1,John,1
2,Carla,2
3,Simon,1
4,Celine,2
5,Winston,1
6,Diana,2

Edges

Source,Target,Weight

1,2,1
1,3,1
1,4,1
1,6,1
2,4,1
2,6,2
3,6,1
4,6,1
5,6,2



	John	Carla	Simon	Celine	Winston	Diana
John	0	1	1	1	0	1
Carla	0	0	0	1	0	2
Simon	0	0	0	0	0	1
Celine	0	0	0	0	0	1
Winston	0	0	0	0	0	2
Diana	0	0	0	0	0	0

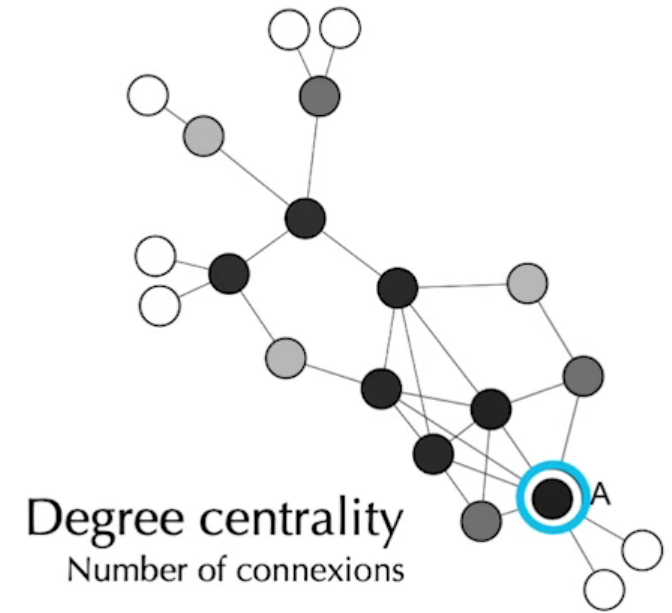
Network Graph

Network Data

Examples	
People	Customers
Products	GRAB
Words/texts	Web-pages
Brain neurons	Proteins
Geographical locations	Genes
Predators and Preys	Sensors
Bicycles	Etc.

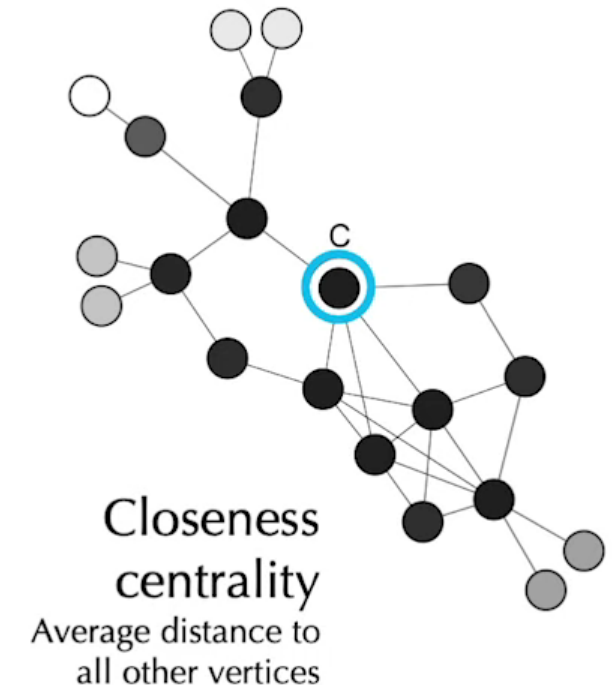
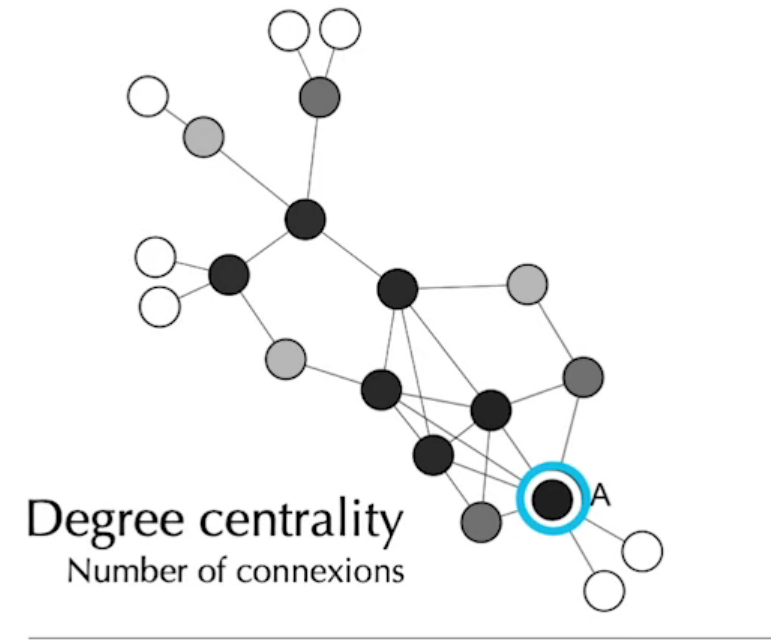
Example of **Measurements** in Complex Network

- ❑ The **darker point**, the higher the score
- ❑ **Blue point** is the vertex with the highest value
- ❑ **Degree** centrality – consisting in *counting the number* of connections of each vertex → Identify **influential (vital) nodes** in networks.



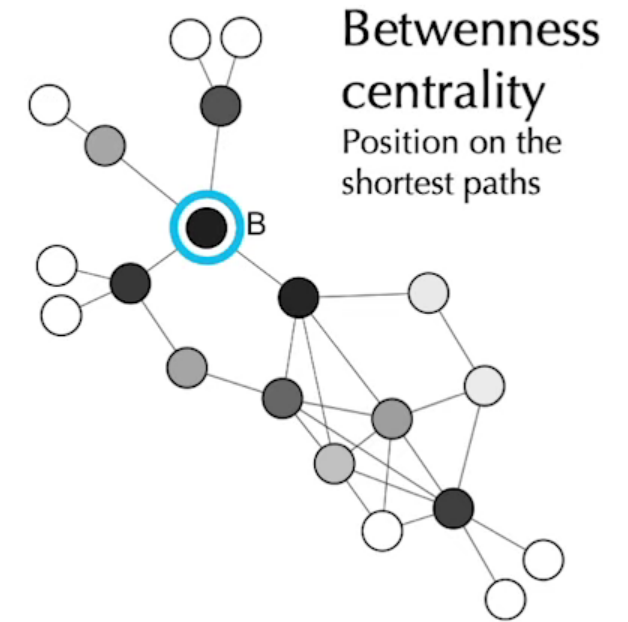
Example of **Measurements** in Complex Network

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- ❑ **Closeness** centrality – measuring *how quickly a node can access other nodes in the network*. The smallest average distance is closest to all the others on average (middle of the graph) → Identifying **nodes that can spread information efficiently**.



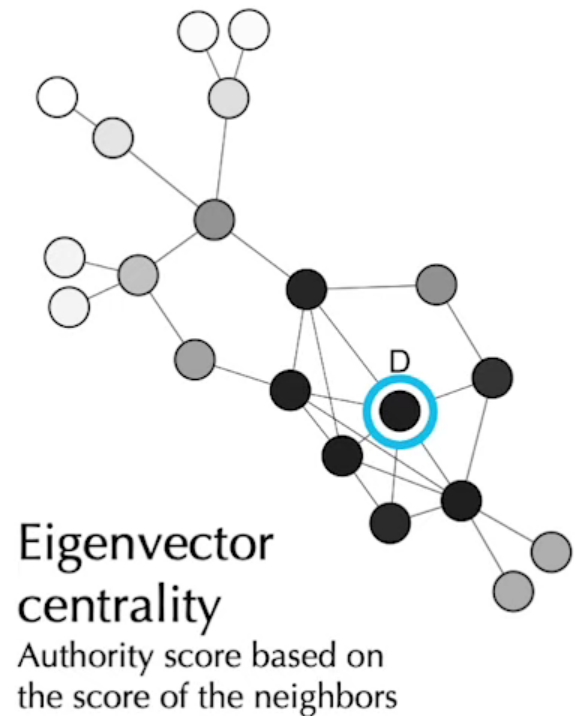
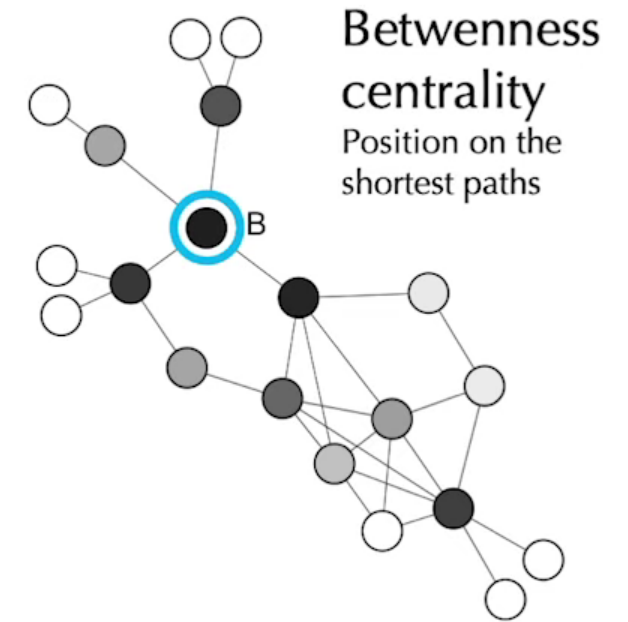
Example of **Measurements** in Complex Network

- ❑ **Betweenness** centrality – *number of shortest paths that pass through a node*
(bridges/information carriers) → Identifying **critical nodes that control information flow.**



Example of **Measurements** in Complex Network

- ❑ **Betweenness** centrality – *number of shortest paths that pass through a node* (bridges/information carriers) → Identifying **critical nodes that control information flow**.
- ❑ **Eigenvector** centrality – measuring *how well a given actor* is connected to other well-connected actors (score of the neighbors)



Analysis of the Air Transport Network Characteristics of Major Airports

Min Geun SONG^a, Gi Tae YEO^b

^a Ph.D., Incheon National University, Korea, E-mail: haoweather@naver.com (First Author)

^b Professor, Incheon National University, Korea, E-mail: ktyeo@inu.ac.kr (Corresponding Author)

Analysis of the air transport network of 1,060 airports in 173 countries based on the measurements.

- Identifying the airports with **high centrality** in the network was **Istanbul Ataturk Airport in Turkey**, followed Beijing, Chicago O'Hare, Hartsfield-Jackson Atlanta, and Frankfurt airports.
- Identifying the betweenness centrality, the **airports of Canada's Toronto, Qatar's Doha, Japan's Haneda, Indonesia's Jakarta** attained **higher betweenness centrality** than degree centrality.
- The sum of the **degree centrality** of the **United States and China accounted for 49.55%**, and the **betweenness centrality accounted for 46.99%** in the entire network.
- In the US network, South America and Europe had the highest degree centrality, and **Asia obtained the highest betweenness centrality**. In the Chinese network, Asia and Europe had the highest degree centrality, and **betweenness centrality was concentrated in Asia**.

Key Objectives in Complex Network Research

Key Objectives in **Complex Network Research**

1. **Identification of Key Nodes and Connections**

- Identify the most **influential (vital) nodes** that significantly impact network behavior
- Develop **advanced centrality measurement** techniques
- Understand **node importance across** different **network** types (directed, undirected, weighted)

Identify the most influential (vital) nodes

Algorithm 1 NPIC.

Input: Network $G = (V, E)$ with N nodes and E edges. Tunable parameters: α, β .

Output: Sorted $NPIC_v$.

```

i = 1
while i ≤ |V| do
    j = 1
    while j ≤ |V| do
        Compute the distance between the nodes  $d_{ij}$ 
        j = j + 1
    end
    i = i + 1
end
i = 1
while i ≤ |V| do
    Calculate  $SI_i$  using:  $SI_i = \frac{(degree(i) \times kshell(i)) + \alpha}{n}$ 
    j = 1
    while j ≤ |V| do
        if  $i \neq j$  then
            Calculate  $PI_i$  using,  $PI_i = \sum_{i \neq j} \frac{(degree(j) \times kshell(j)) + \beta}{d_{ij}}$ 
        end
        j = j + 1
    end
    Calculate  $NPIC_i$  using:  $NPIC_i = SI_i \times PI_i$ 
    i = i + 1
end
return  $NPIC_v$ 

```

Table 2 Ranking comparison of NPIC and other benchmark algorithms with NPIC and SIR values displayed in the final two columns

Rank	BC	CC	EC	PR	HI	PL	GIC	AOGC	GEM	NPIC	Value	SIR	SIR values
1	4	4	4	4	4	4	4	4	4	4	75.23	4	1.98
2	10	2	2	2	2	2	1	1	3	2	62.3	2	1.67
3	2	1	1	10	5	7	2	3	1	1	52.15	1	1.53
4	5	3	3	1	1	3	3	2	2	3	39.00	5	1.46
5	8	10	5	5	10	5	5	8	8	5	21.73	3	1.44
6	1	8	8	3	3	8	7	7	7	8	21.11	8	1.43
7	3	7	7	7	3	1	8	5	11	7	14.53	7	1.39
8	11	5	10	1	7	10	10	11	5	10	10.59	10	1.35
9	7	11	6	12	12	11	11	10	6	11	3.30	11	1.29
10	6	12	9	13	11	6	6	6	10	6	2.51	6	1.22
11	9	13	12	9	9	9	9	9	9	9	2.49	9	1.19
12	12	9	6	13	12	12	13	12	12	12	2.31	12	1.18
13	13	6	13	11	13	12	13	13	13	13	2.31	13	1.11

Source: Ullah, A., Sheng, J., Wang, B., Din, S. U., & Khan, N. (2024). Leveraging neighborhood and path information for influential spreaders recognition in complex networks. *Journal of Intelligent Information Systems*, 62(2), 377-401.

Skeleton Network Extraction: Global Terrorism Network

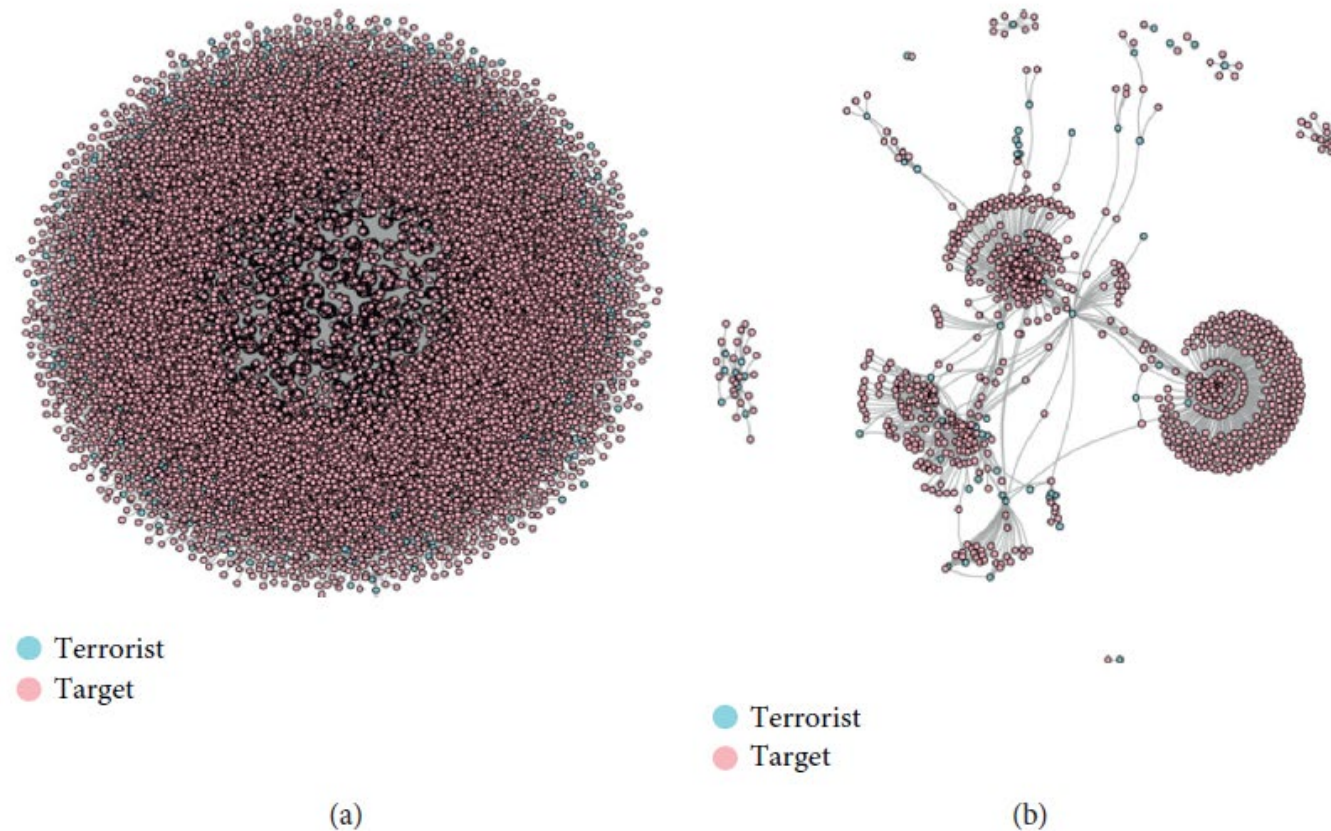


FIGURE 2: The graphical representation of (a) the original network and (b) the extracted TPKS-skeleton network both exhibit relationships between two classes of nodes: terrorists and targets.

Source: Wang, S., Malang, K., Yuan, H., Phaphuangwittayakul, A., Lv, Y., Lowdermilk, M. D., & Geng, J. (2020). Extracting Skeleton of the Global Terrorism Network Based on m-Modified Topology Potential. *Complexity*, 2020(1), 7643290.

Skeleton Network Extraction: Global Terrorism Network

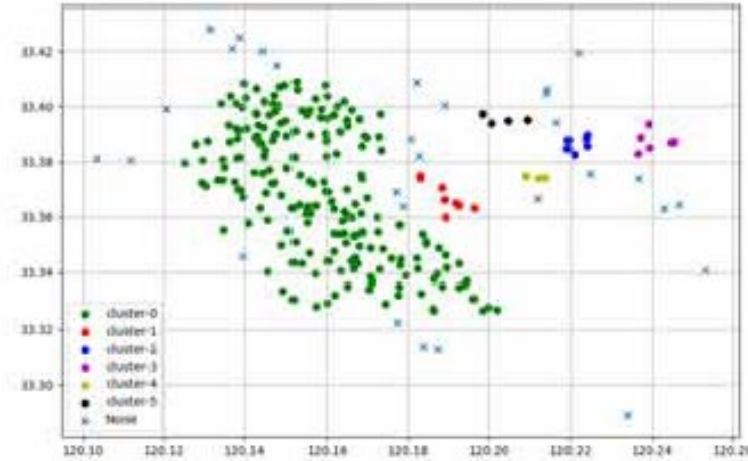
TABLE 2: Top 20 targets of the skeleton network comparing with the original global terrorism network.

Original network			Skeleton network		
Rank	Target nodes	TPKS	Rank	Target nodes	TPKS
1	Private Citizens & Property Belfast	25.34	1	Private Citizens & Property Belfast	25.34
2	Business Belfast	23.69	2	Business Belfast	23.69
3	Government (General) Belfast	23.25	3	Government (General) Belfast	23.25
4	Business Paris	21.72	4	Business Paris	21.72
5	Business San Miguel	21.19	5	Private Citizens & Property Lurgan	21.09
6	Private Citizens & Property Lurgan	21.09	6	Police Belfast	21.01
7	Police Belfast	21.01	7	Terrorists/Nonstate Militia Belfast	20.57
8	Private Citizens & Property Portadown	20.82	8	Private Citizens & Property Londonderry	20.29
9	Private Citizens & Property Lima	20.63	9	Private Citizens & Property Newtownabbey	19.17
10	Government (General) Lima	20.59	10	Private Citizens & Property Baghdad	18.87
11	Terrorists/Nonstate Militia Belfast	20.57	11	Transportation London	18.26
12	Business Lima	20.49	12	Business Baghdad	17.56
13	Private Citizens & Property Londonderry	20.29	13	Government (General) Baghdad	17.25
14	Private Citizens & Property Concepcion	19.65	14	Private Citizens & Property Istanbul	16.97
15	Airports & Aircraft Trujillo	19.54	15	Business Santiago	16.94
16	Private Citizens & Property San Miguel	19.34	16	Private Citizens & Property Armagh	16.77
17	Private Citizens & Property Newtownabbey	19.17	17	Business Manchester	16.55
18	Private Citizens & Property Baghdad	18.86	18	Government (General) Tuulo Barwaqo	16.52
19	Private Citizens & Property Ballymena	18.64	19	Military Basra	16.52
20	Private Citizens & Property Craigavon	18.61	20	Journalists & Media Bogota	16.52

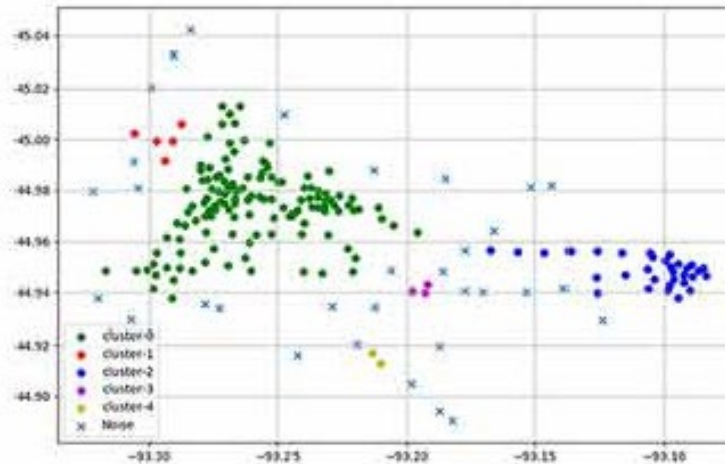
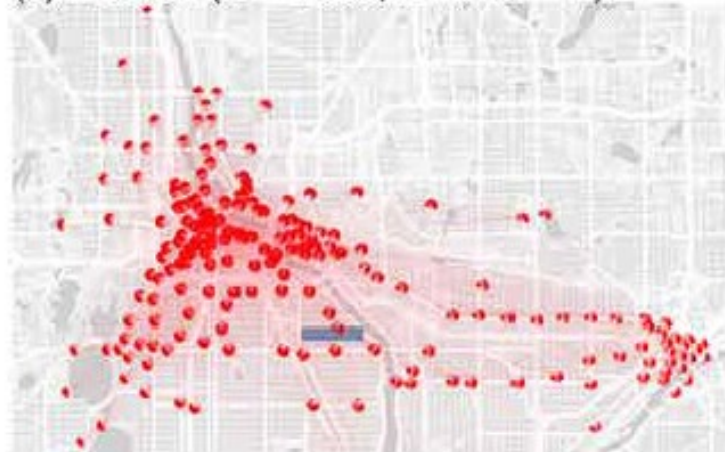
Source: Wang, S., Malang, K., Yuan, H., Phaphuangwittayakul, A., Lv, Y., Lowdermilk, M. D., & Geng, J. (2020). Extracting Skeleton of the Global Terrorism Network Based on m-Modified Topology Potential. Complexity, 2020(1), 7643290.

Skeleton Network Extraction: Bicycle Sharing Networks

(a) Yancheng ($\epsilon = 700, \text{MinPts} = 2$)



(b) Niceride ($\epsilon = 1000, \text{MinPts} = 2$)



Source: Malang, K., Wang, S., Lv, Y., & Phaphuangwittayakul, A. (2020). Skeleton network extraction and analysis on bicycle sharing networks. International Journal of Data Warehousing and Mining (IJDWM), 16(3), 146-167.

Identifying Influential Nodes + Skeleton Network Extraction

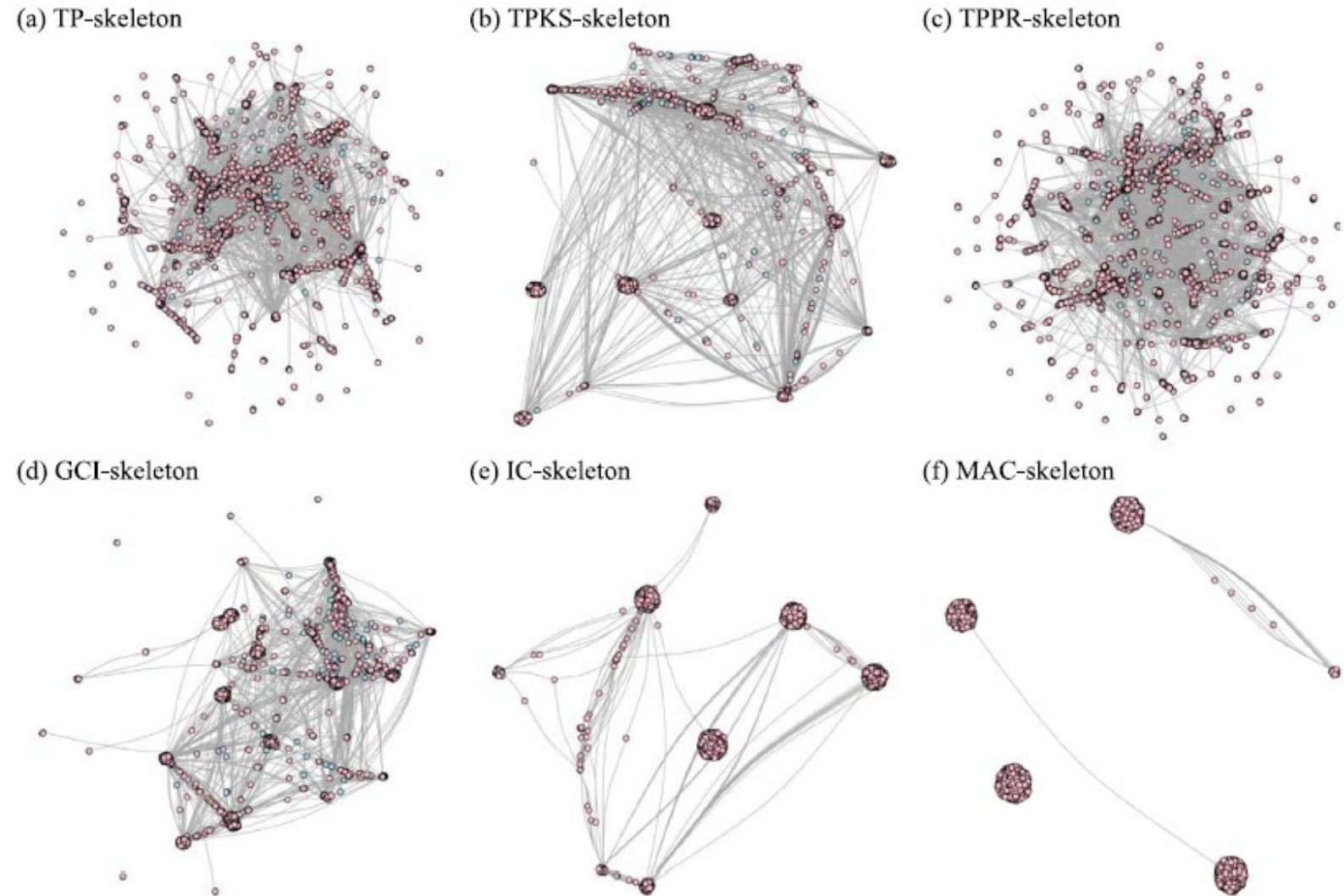


Fig. 4. The graphical representation of the extracted skeleton networks from different methods. (a) TP-skeleton, (b) TPKS-skeleton, (c) TPPR-skeleton, (d) GCI-skeleton, (e) IC-skeleton, and (f) MAC-skeleton.

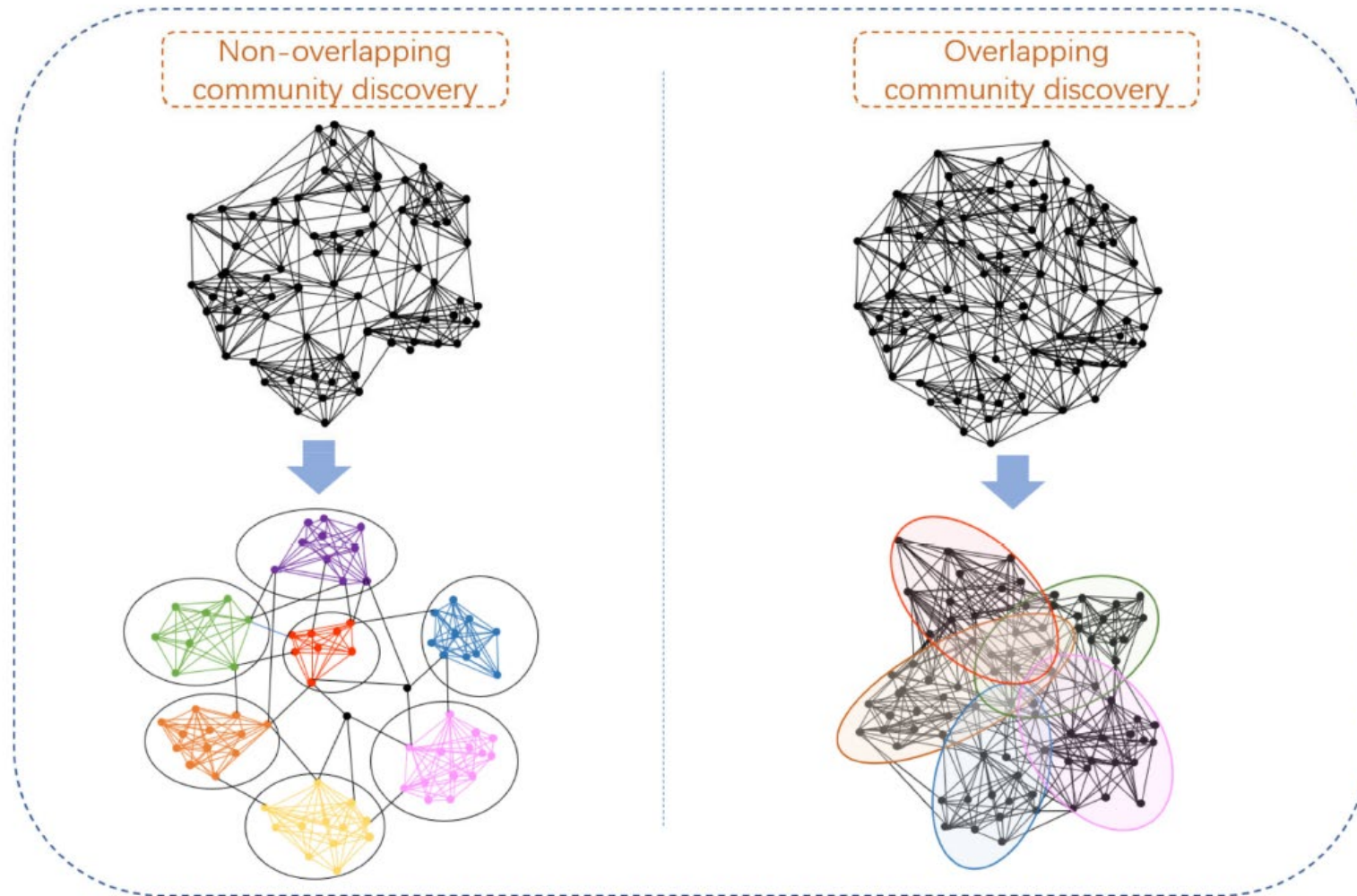
Source: Malang, K., Wang, S., Phaphuangwittayakul, A., Lv, Y., Yuan, H., & Zhang, X. (2020). Identifying influential nodes of global terrorism network: A comparison for skeleton network extraction. *Physica A: Statistical Mechanics and its Applications*, 545, 123769.

Key Objectives in **Complex Network Research**

2. Network Structure Analysis

- Comprehend **network topology** and **structural characteristics**
- Analyze **relationships and interaction patterns** between nodes
- Detect **community structure** and hidden network configurations

Community Detection



Source: Wang, J., Wang, J., Guo, J., Wang, L., Zhang, C., & Liu, B. (2023). Research progress of complex network modeling methods based on uncertainty theory. *Mathematics*, 11(5), 1212.

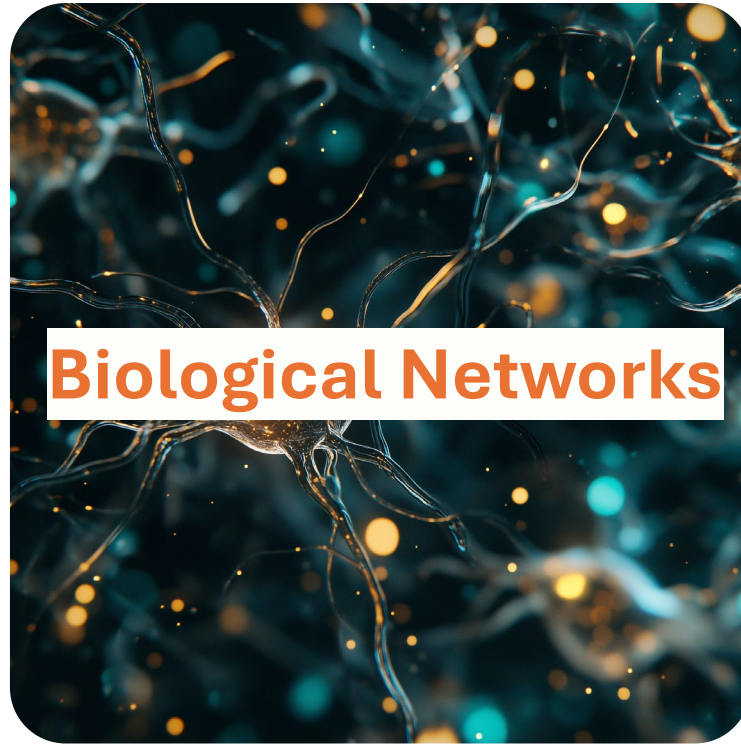
Key Objectives in **Complex Network Research**

3. Performance and Optimization

- Identify network bottlenecks
- Optimize network performance
- Enhance network efficiency and resource allocation
- Predict network behavior and trends

Real-world Examples of Complex Networks

Real-world Examples of Complex Networks



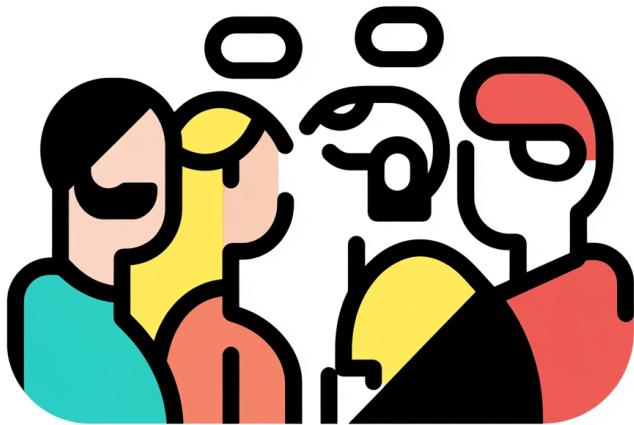
Social Networks

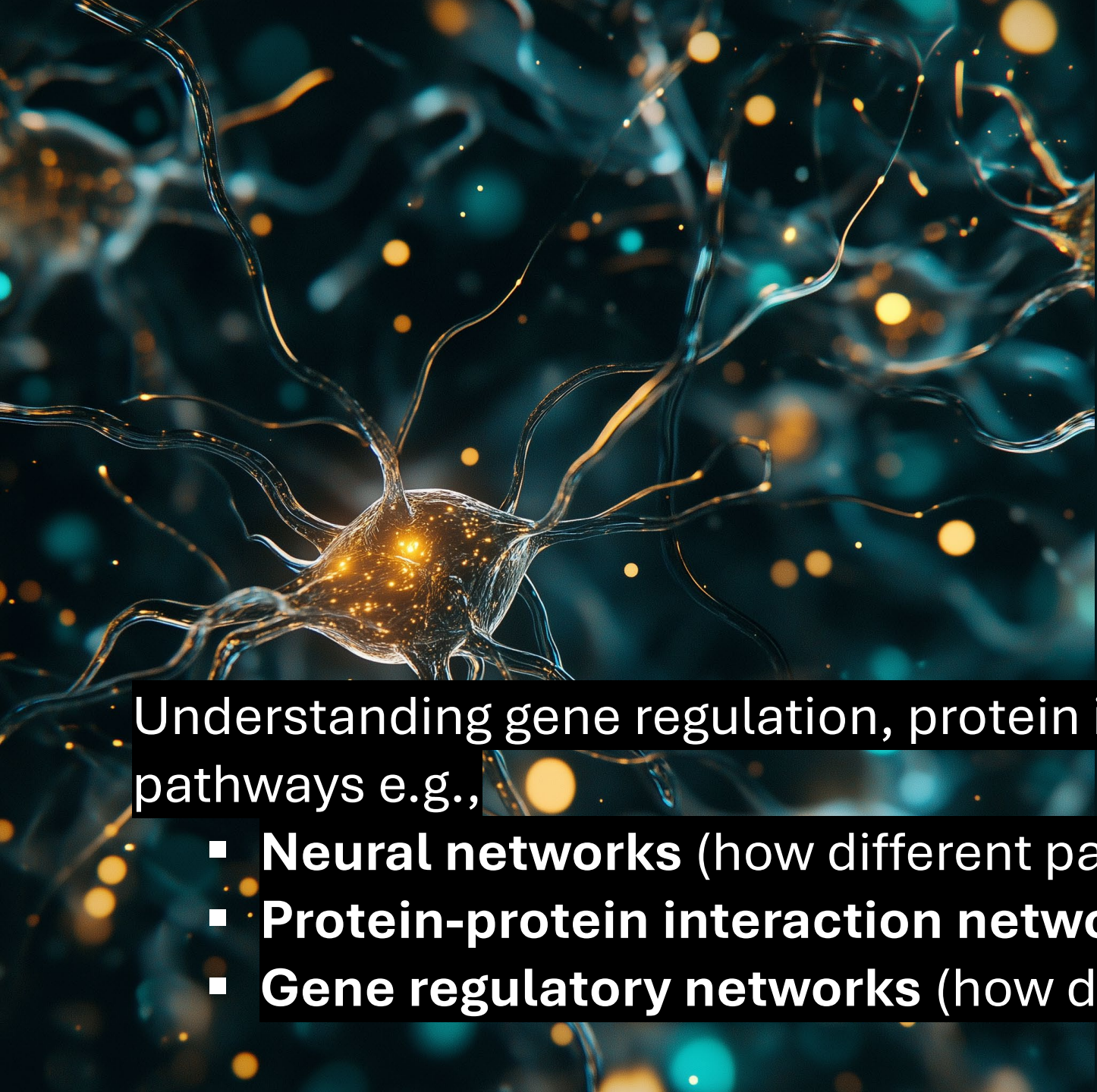
Understanding **social interactions**, **information diffusion**, and **influence propagation** within online platforms e.g., Facebook, X (Twitter), Instagram, TikTok



Applications in **Social Networks**

- **Community Detection:** Identifying groups within a network
- **Viral Marketing:** Utilizing network structure to maximize message spread



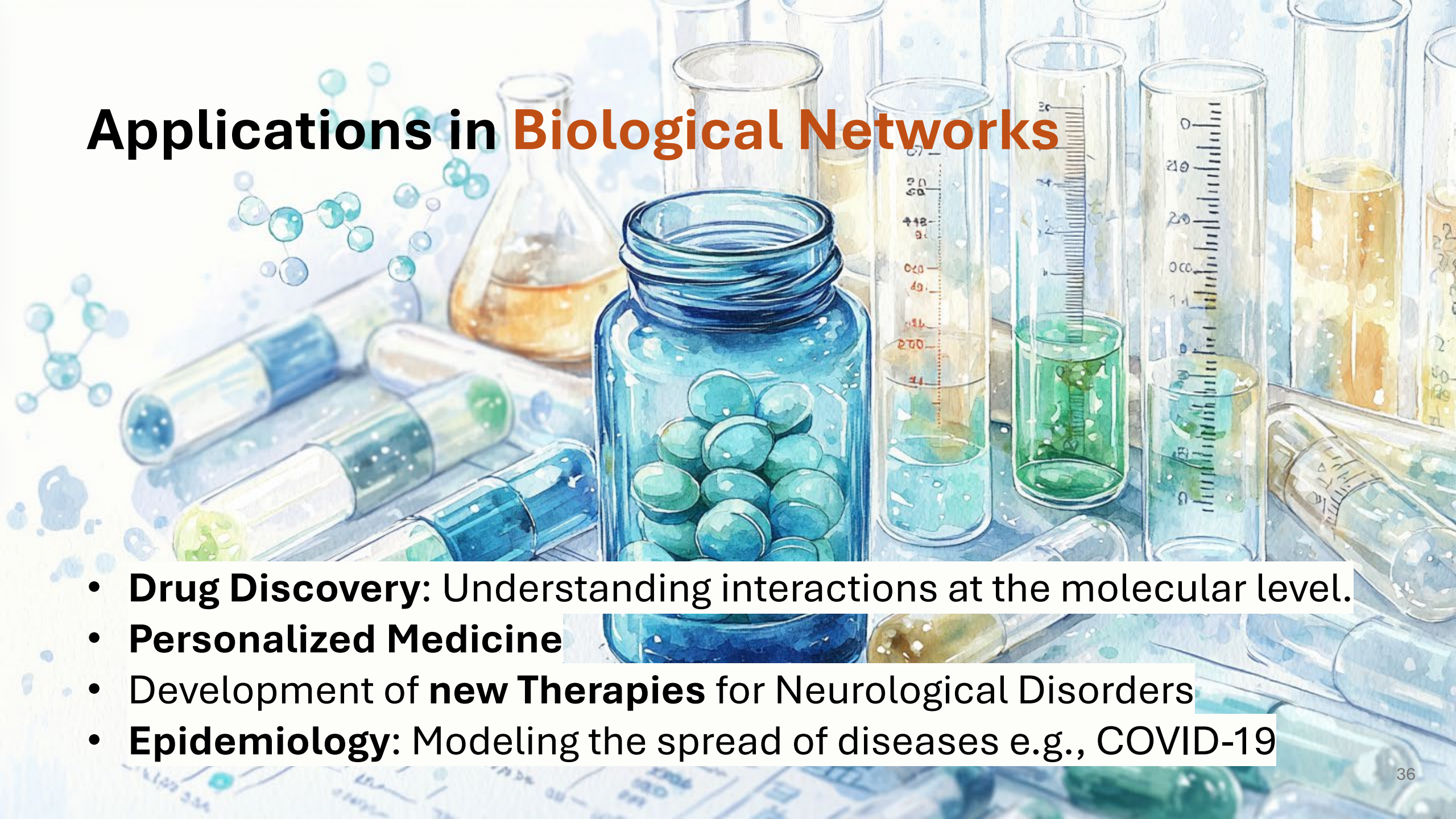


Biological Networks

Understanding gene regulation, protein interactions, and disease pathways e.g.,

- **Neural networks** (how different parts of the brain interact)
- **Protein-protein interaction networks** (how cells function)
- **Gene regulatory networks** (how diseases spread)

Applications in **Biological Networks**



- **Drug Discovery:** Understanding interactions at the molecular level.
- **Personalized Medicine**
- Development of **new Therapies** for Neurological Disorders
- **Epidemiology:** Modeling the spread of diseases e.g., COVID-19

Technological Networks

Essential for ensuring the **reliability** and **security** of critical infrastructure

- The World Wide Web (Internet)
- Power grids
- Transportation networks



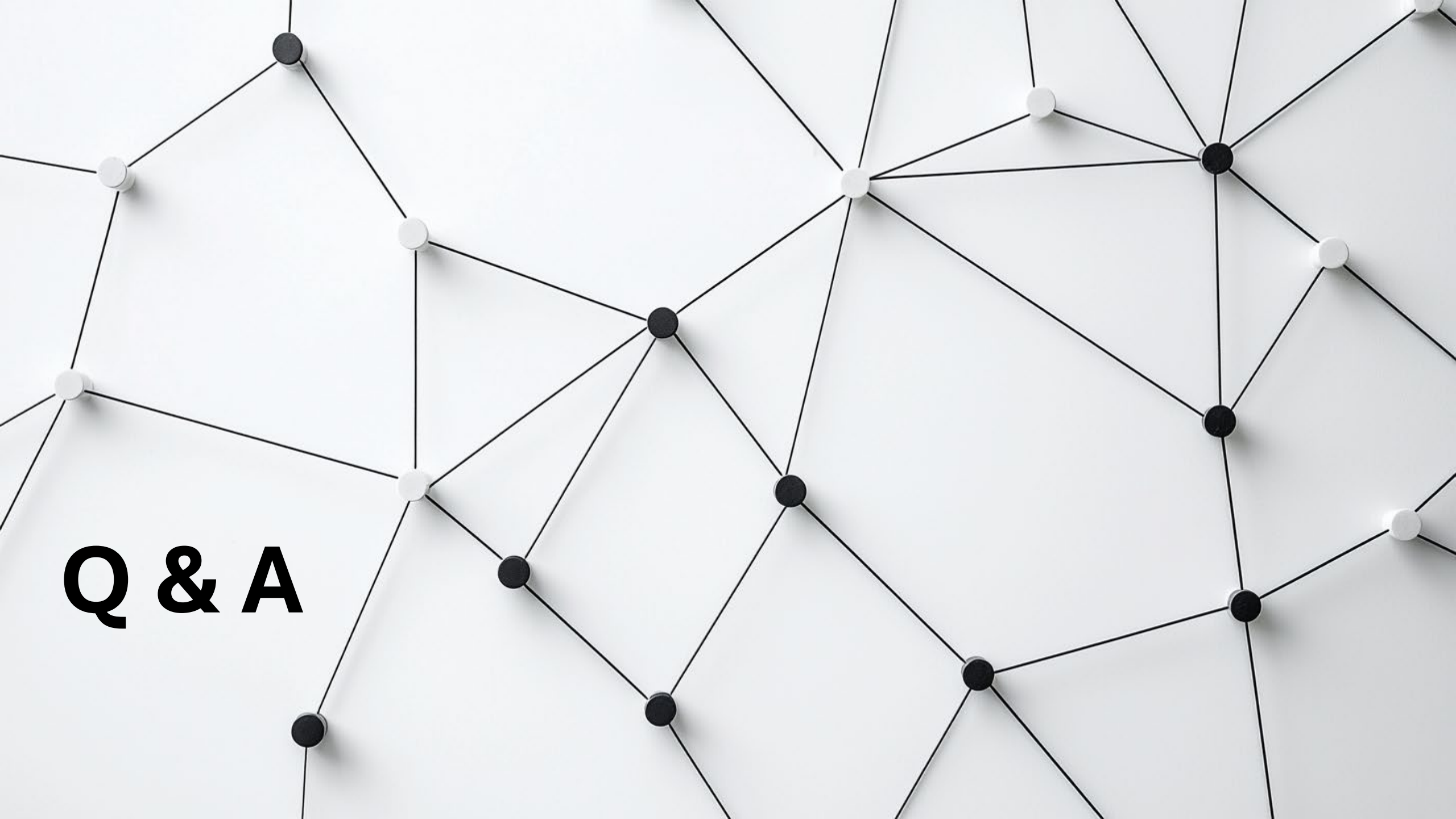
Applications in **Technological Networks**

- **Optimizing Traffic Flow:** Improving transportation efficiency
- **Planning Infrastructure Development**
- **Internet Security:** Protecting data flow and network integrity
- **Network Optimization:** Enhancing performance and efficiency



Other Applications

- **Smart Cities:** Leveraging networks for urban management
- **Bitcoin Networks:** Fraud detection, anomaly detection
- **Financial Risk Management:** Assess financial risk, detect systemic vulnerabilities, and predict market crashes



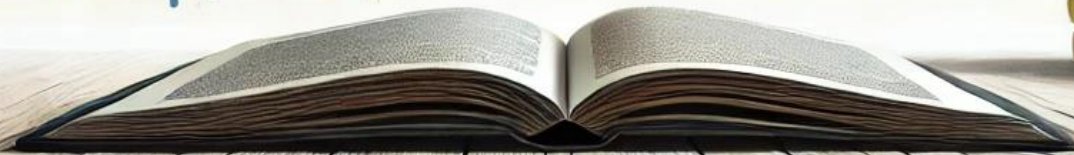
Q & A

Dr. Phill Freiberg



ICDI International College of
DIGITAL INNOVATION
CHIANG MAI UNIVERSITY

**FLIPPED LEARNING
AT ICDI**



Introduction

Dr. Phillip's presentation on the Flipped Learning Method highlights its potential to address key challenges at the International College of Digital Innovation (ICDI), particularly low English proficiency and high failure rates in mathematics and statistics. By reversing the traditional teaching model, students engage with lecture materials and quizzes online before class, freeing in-class time for interactive problem-solving, discussions, and presentations. This approach ensures foundational comprehension, encourages active participation, and accommodates diverse learning paces, particularly benefiting ESL students who can revisit lecture content. Emphasizing innovation and high standards, Dr. Phillip advocates for leveraging technology like AI tools and multimedia resources to create reusable, high-quality teaching materials that enhance both student learning outcomes and educators' professional development.

Million Dollar Question **可以用来去中国旅游**

อาจารย์สี่ะ คุณอยู่เมืองไทยมานานเท่าไรแล้วคะ ทำไมคุณถึง
ยังไม่สามารถพูดภาษาไทยได้แม้จะผ่านมานานหลายปีแล้ว

நீங்கள் படிக்கத் தெரியாததால் தாய்லாந்து மக்கள்
சிரித்தனர். அவர்கள் ஏன் இப்போது சிரிக்கவில்லை?

थाई लोग हँसते हैं क्योंकि आप पढ़ नहीं सकते। वे अब क्यों नहीं हंस रहे हैं?

يمكن من الفوز بمليون دولار. لذلك سيستمر
في التدريس **1000000 долларов**
остается в М.К.Ц.И.

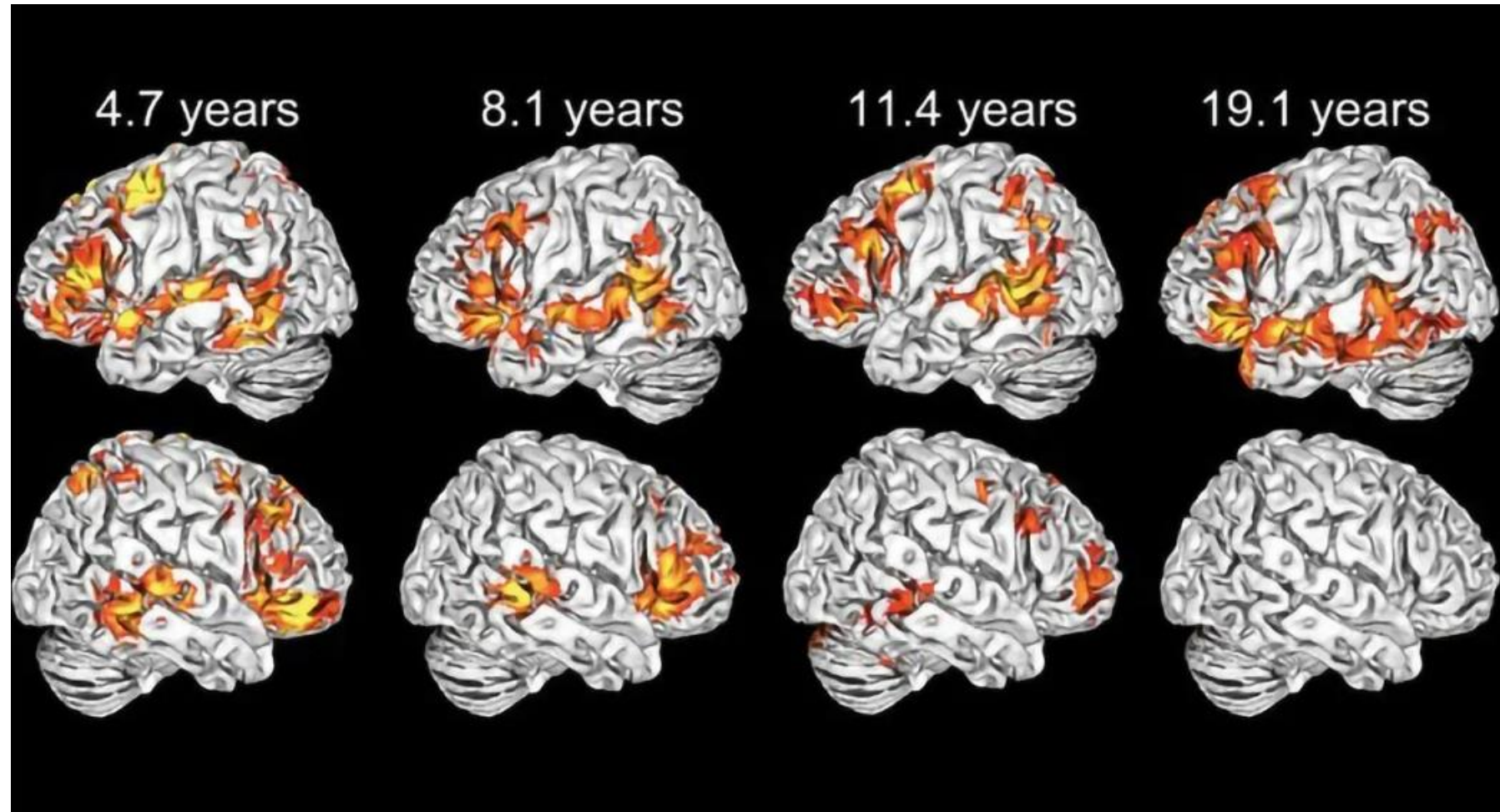
Language is a local *secret code* we learn (to function) as children or as adults.

Nobody learns a language that can't be used, duh

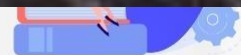


Answer

- Children learn (acquire) language (First, Second, etc) differently, not as adults do.



First or additional language with children



(E)

Under

e.g. c
uncor

Some
always

NEUROPLASTICITY

The Ability of the Brain to Reorganize Itself,
Both in Structure and How It Functions

HOW THE BRAIN CHANGES



NEUROGENESIS

Continuous generation
of new neurons in
certain brain regions



NEW SYNAPSES

New skills and
experiences
create new neural
connections



STRENGTHENED SYNAPSES

Repetition and
practice strengthens
neural connections



WEAKENED SYNAPSES

Connections in the
brain that aren't used
become weak



FYI: Learning Math is similar to Language

- BASIC math is hardwired into the brain and is effortless



- but COMPLEX/abstract math & Stats require 'Adult Style' learning

i.e.

1. Understand the rules (*a minus sign with another minus sign results in a plus sign.*)

2. Apply knowledge to solve problems $-3-5=$ **-8**

3. Continue to next level

$$\frac{\sqrt{a}}{\sqrt{b}} = \frac{\sqrt{a}}{\sqrt{b}} \left(\frac{\sqrt{b}}{\sqrt{b}} \right) = \frac{\sqrt{ab}}{b}$$

Abstract

specific

Calcworkshop.com

specific

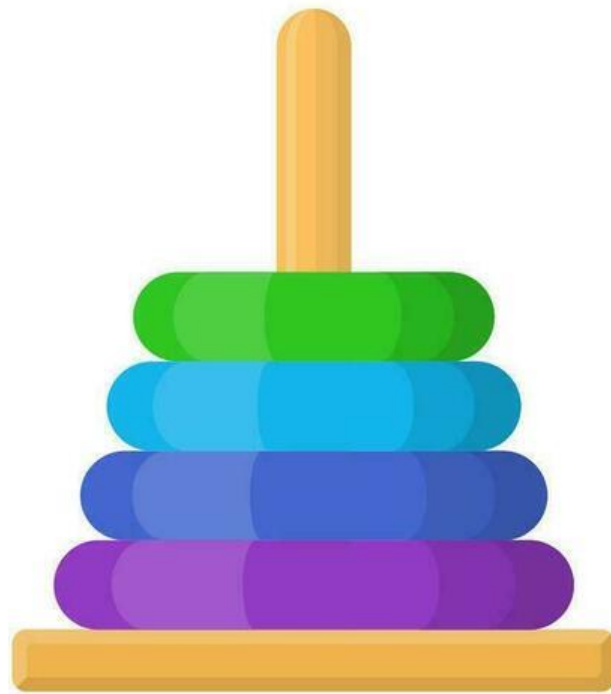
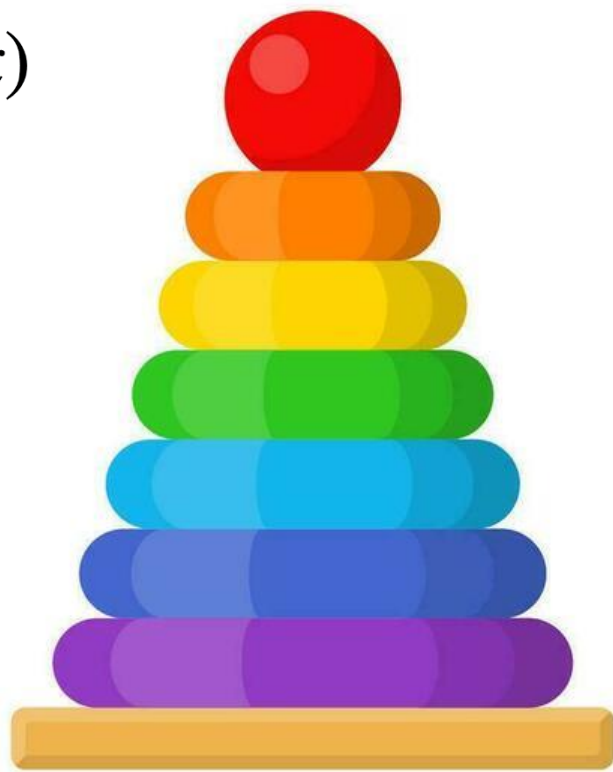
abstract

$$\frac{\sqrt{7}}{\sqrt{5}} = \frac{\sqrt{7}}{\sqrt{5}} \left(\frac{\sqrt{5}}{\sqrt{5}} \right) = \frac{\sqrt{35}}{5}$$

$$\frac{d}{dx}x^x = x^x(1 + \ln x)$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$2+2=4$$



Practical Ap

Deviation

A HOUSE BUILT ON SAND

Engineering and Reliability
Analysis

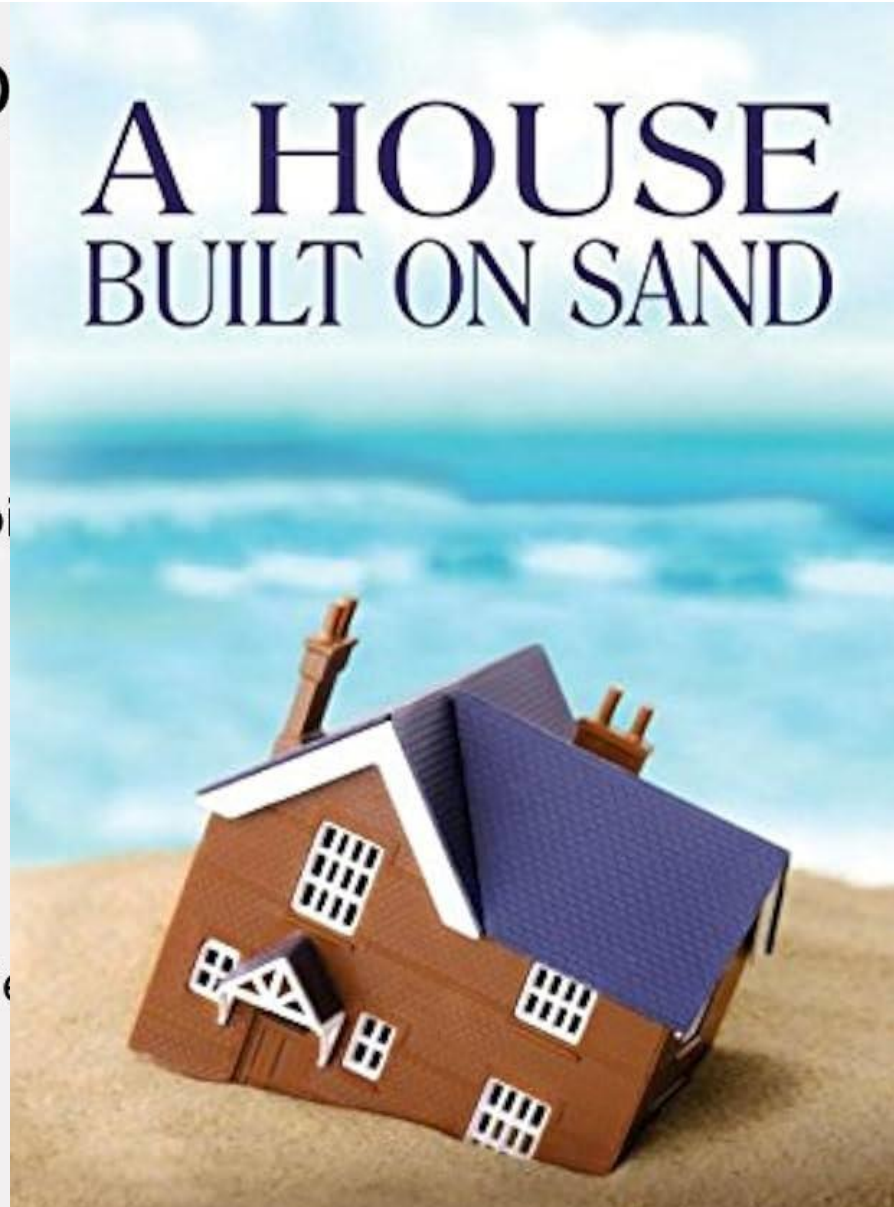
Quality Control and
Manufacturing

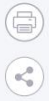
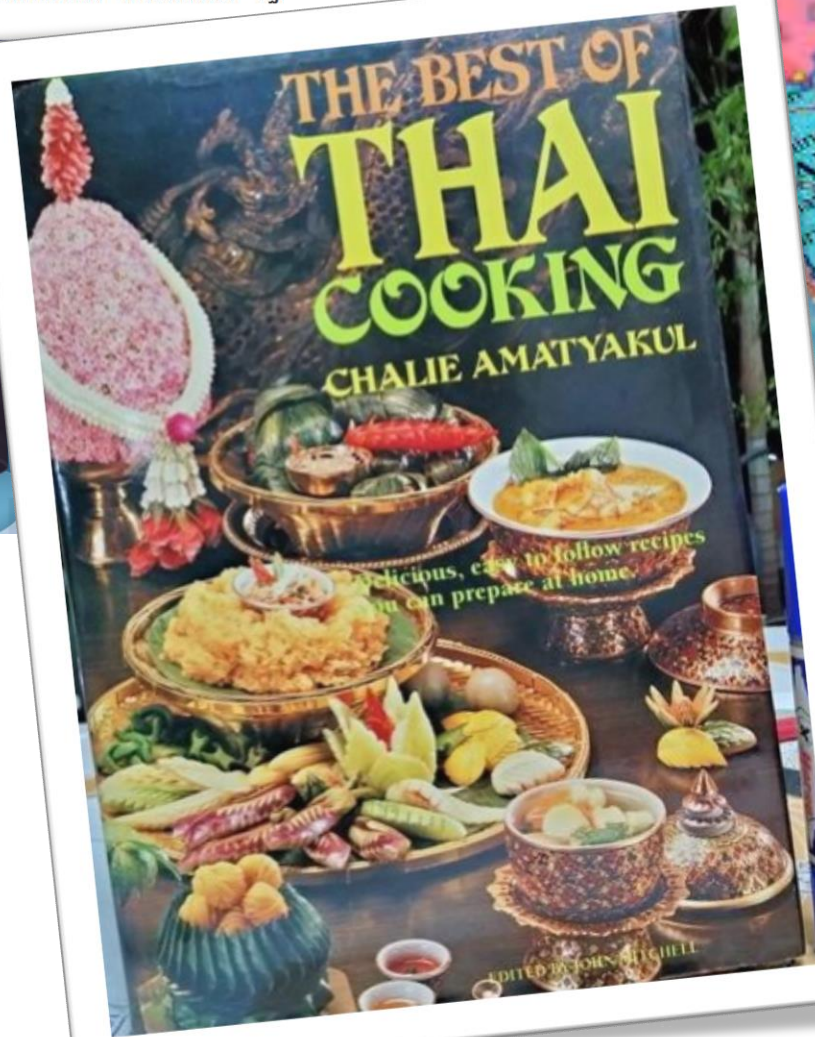
Psychology and Social
Sciences

Biological and Medical
Research

Environmental Studies

Risk and Assessment



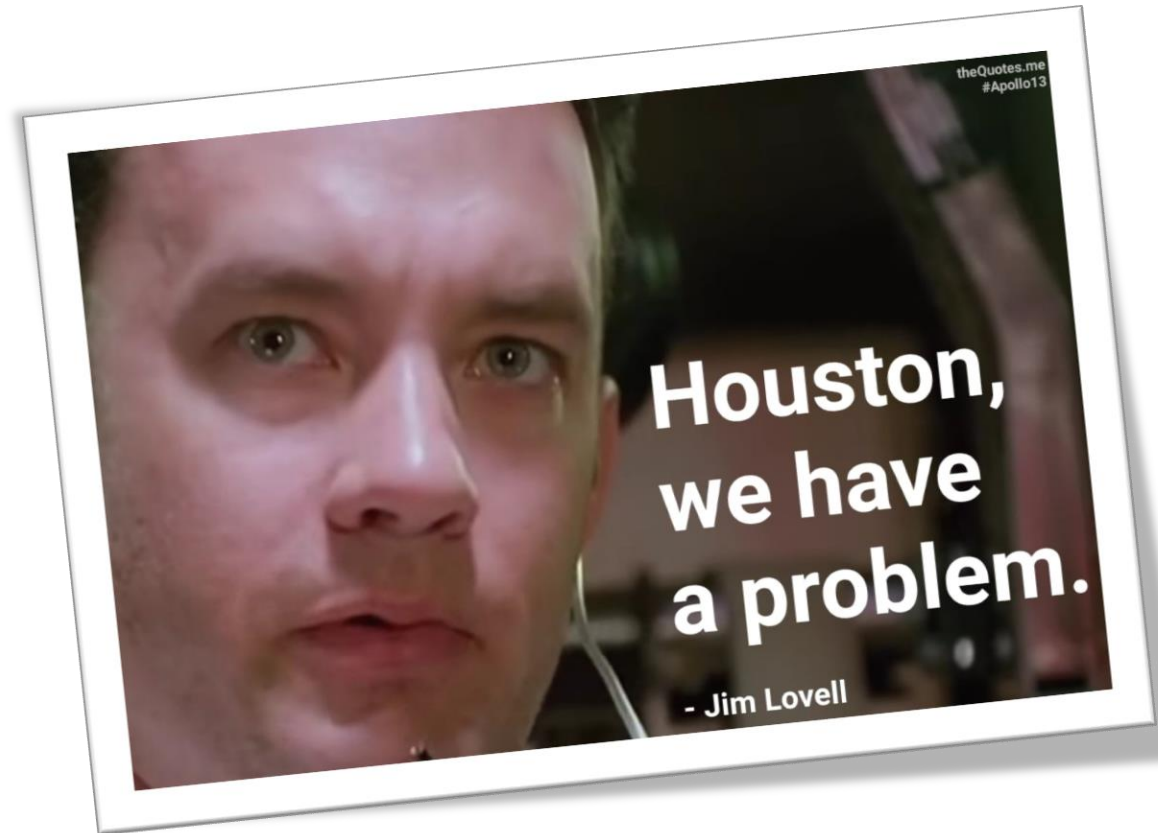
KIATNAKIN
PHATRAทำไมคุณภาพการศึกษา
แย่ลงทุกปี ?

- **Problem** -Curriculum Structure: The Thai curriculum is content-heavy, emphasizing rote learning over critical thinking and problem-solving skills.

ICDI has a problem... actually TWO

First- Low level of English Language, we are **IC** and yet many students can *hardly* speak English (despite IELTS 5.5). I'm sure they struggle with academic writing.

Second- up to 30% of first-year students fail mathematics and statistics courses and must retake them. (*disclaimer: Math and Stats require TOTAL commitment, I'm not picking up on these subjects*)



I would like to solve these problems, so I
hypothesized about the causes of the problems



Probable causes of the problem: HR



Quality of Teaching:

This is *unlikely* the cause, as ICDI employs highly qualified, PhD-educated lecturers.



Probable causes of the problem: Student stock

- **Student Preparedness:** Many students may lack a strong mathematical foundation from high school, leading them to choose non-science majors.
- **LOW ESL** level of students doesn't allow them to grasp the material from the 1st time
- They do not know **how** to study
- Bad schooling in Thailand/China (rote learning, no learning at all, too easy, COVID online education)



Study: Student Learning Decreased in Math, Reading Worldwide



Probable causes of the problem: 'Drunk-alike Learning'

- Classroom Distractions: Students often do not pay attention during lectures due to smartphone distractions.

"We found that people are as impaired when they drive and talk on a cell phone as they are when they drive intoxicated at the legal blood-alcohol limit" of 0.08 percent, which is the minimum level that defines illegal drunken driving in most U.S. states, says study co-author Frank Drews, an assistant professor of ... Mar 25, 2554 BE



The University of Utah

https://archive.unews.utah.edu/news_releases/drivers...

Drivers on Cell Phones Are as Bad as Drunks - UNews Archive



Smartphone bans in schools: Where is it happening and why?

Multiple states in the US and several European countries are taking steps to curb the use of cell phones in schools

Rabia Ali | 12.09.2024 - Update : 12.09.2024



Probable causes of the problem: Outdated
Method, **unsuitable** for the new generation



They are used to learn theory quickly and apply it to practical problems

Google   

All Videos Images Shopping Web News Books  More Tools

www.youtube.com › watch

How to Fix a Flat Tire EASY (Everything you need to know)



11:00 Flat Tire

Learn **how to Fix a Flat Tire** yourself so you can get back on the road! I show the entire process of **fixing a flat tire** from how to inflate ...

YouTube · ChrisFix · Oct 27, 2559 BE

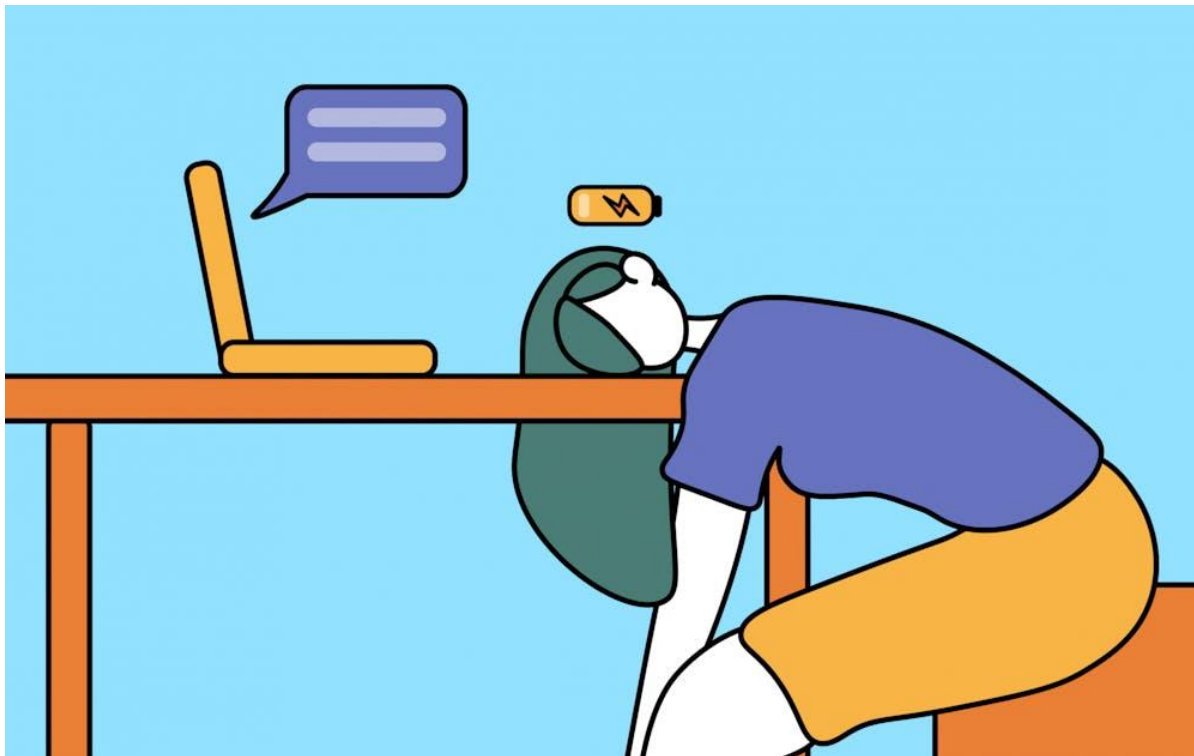
 10 key moments in this video 

Who can endure one hour long monologue
(in ESL)?



Time for a new method in education?

- Even during COVID the model was the same (lecturer preaching for hours to a silent audience)



Probable causes of the problem: Homework Challenges (i.e. no practice)

COMPLEX math/stats require 'Adult style' learning

Understand the rules. (new knowledge)

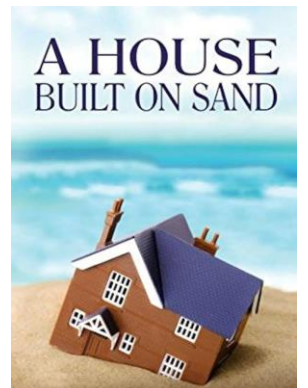
Practice (Apply knowledge to solve problems)

Continue



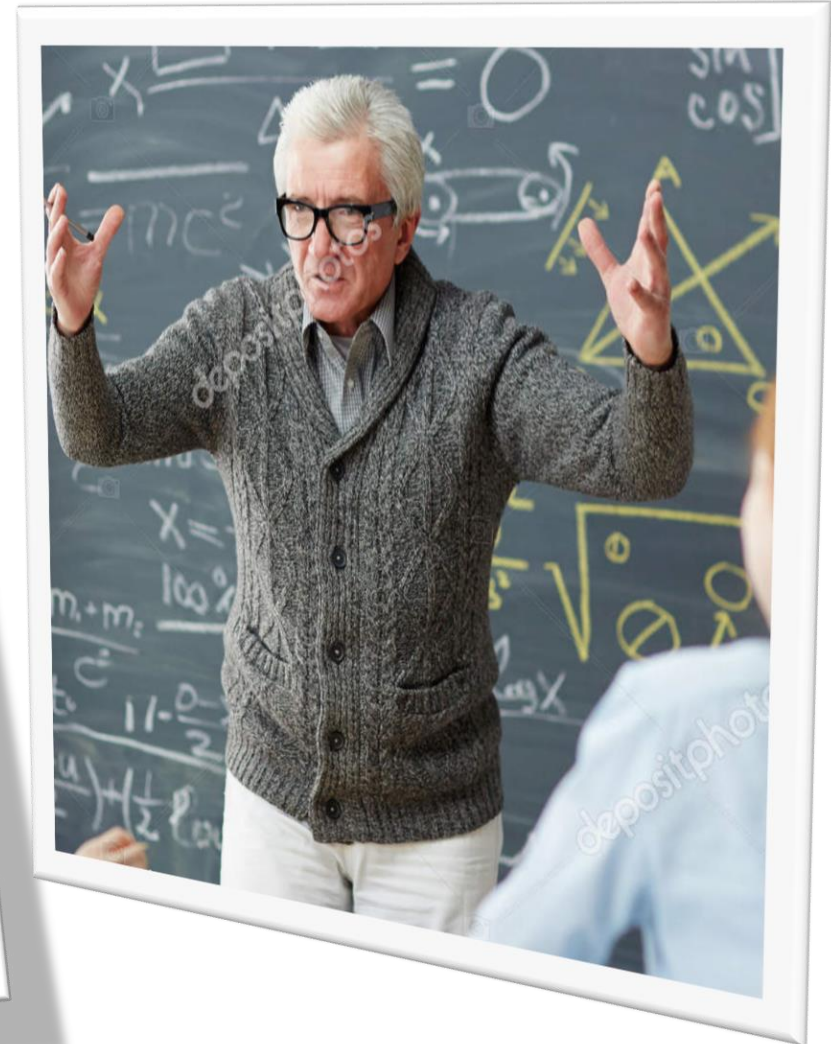
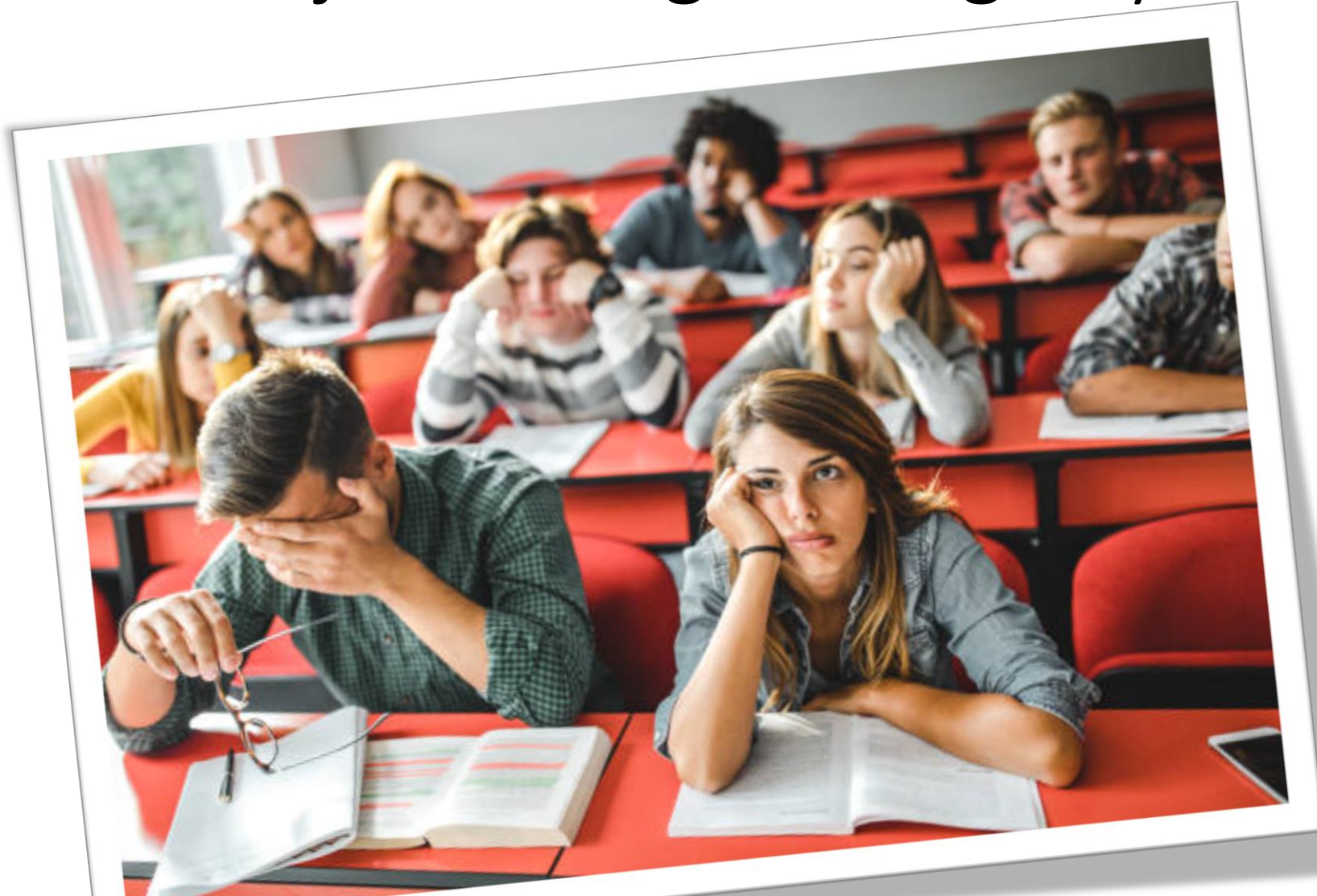
- After **confusing** class, students **struggle** (if they even sit down to do it) with homework because they did not grasp the material during lectures.
- Next lecture come NOT ready for the next
portion of knowledge

Instructor doesn't know that students don't know





Look at your students: they are not excited,
tired just sitting looking at you





Let technology help
us do the things
IMPOSSIBLE BEFORE



Previously change was not possible, now we have digital innovation to help us

- Shopping online
 - Banking online
 - Zoom meetings
 - Telemedicine
 - Library online
- &
- ***OLD LEARNING Method ?!***



Introducing flipped learning

- Instructor records lecture ahead of time
- Students watch the lecture before the class time
- In class students discuss cases, solve cases, do presentations, do practical assignments, solve problems, do quizzes, Q &A

Dictionary

Data from [Oxford Languages](#)

 flip

[flɪp]

verb

1. turn over with a sudden quick movement:

"the plane flipped over and then exploded" · "the yacht was flipped by a huge wave"

foot wave flipped the dinghy over"

Similar: overturn turn over roll over upturn capsize ▼

2. move, push, or throw (something) with a sudden quick movement:

"she flipped off her dark glasses" · "she flipped a few coins on to the bar"

Similar: throw flick toss fling sling pitch cast ▼

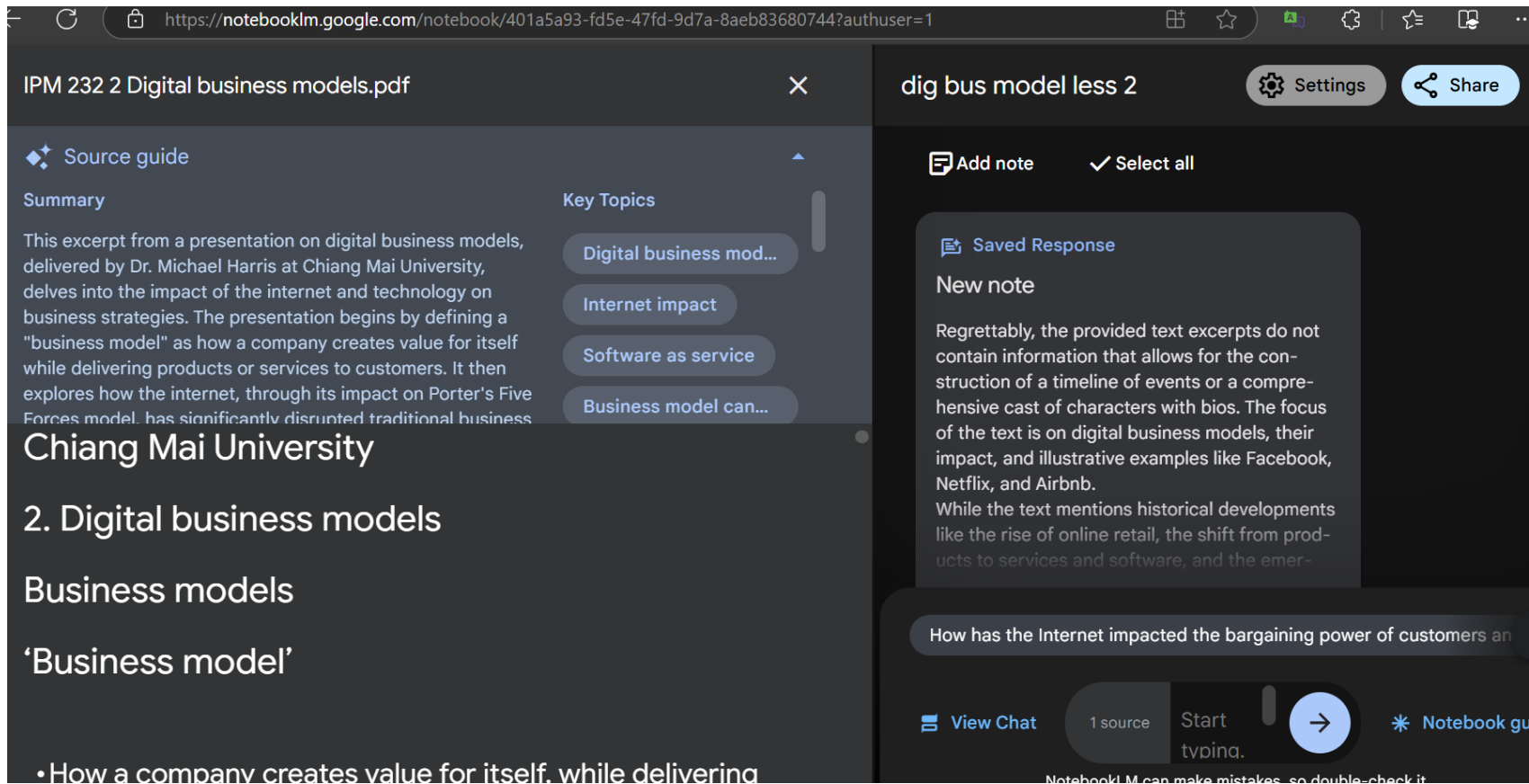


My experience



Let AI be your personal assistant

- Take your materials, turn it into a: script, podcast



The screenshot displays the NotebookLM web application. On the left, a document titled "IPM 232 2 Digital business models.pdf" is open. It includes a "Source guide" section with a summary of a presentation by Dr. Michael Harris at Chiang Mai University, and a "Key Topics" sidebar with tags like "Digital business mod...", "Internet impact", "Software as service", and "Business model can...". The main content area shows the beginning of a presentation on digital business models, mentioning Porter's Five Forces model.

On the right, a chat window titled "dig bus model less 2" is active. It features a "Saved Response" section with a "New note" that discusses the limitations of the provided text excerpts in constructing a timeline or comprehensive cast of characters. The chat input area at the bottom shows a query: "How has the Internet impacted the bargaining power of customers an".



Remember don't work more, work more effectively! Do more with less

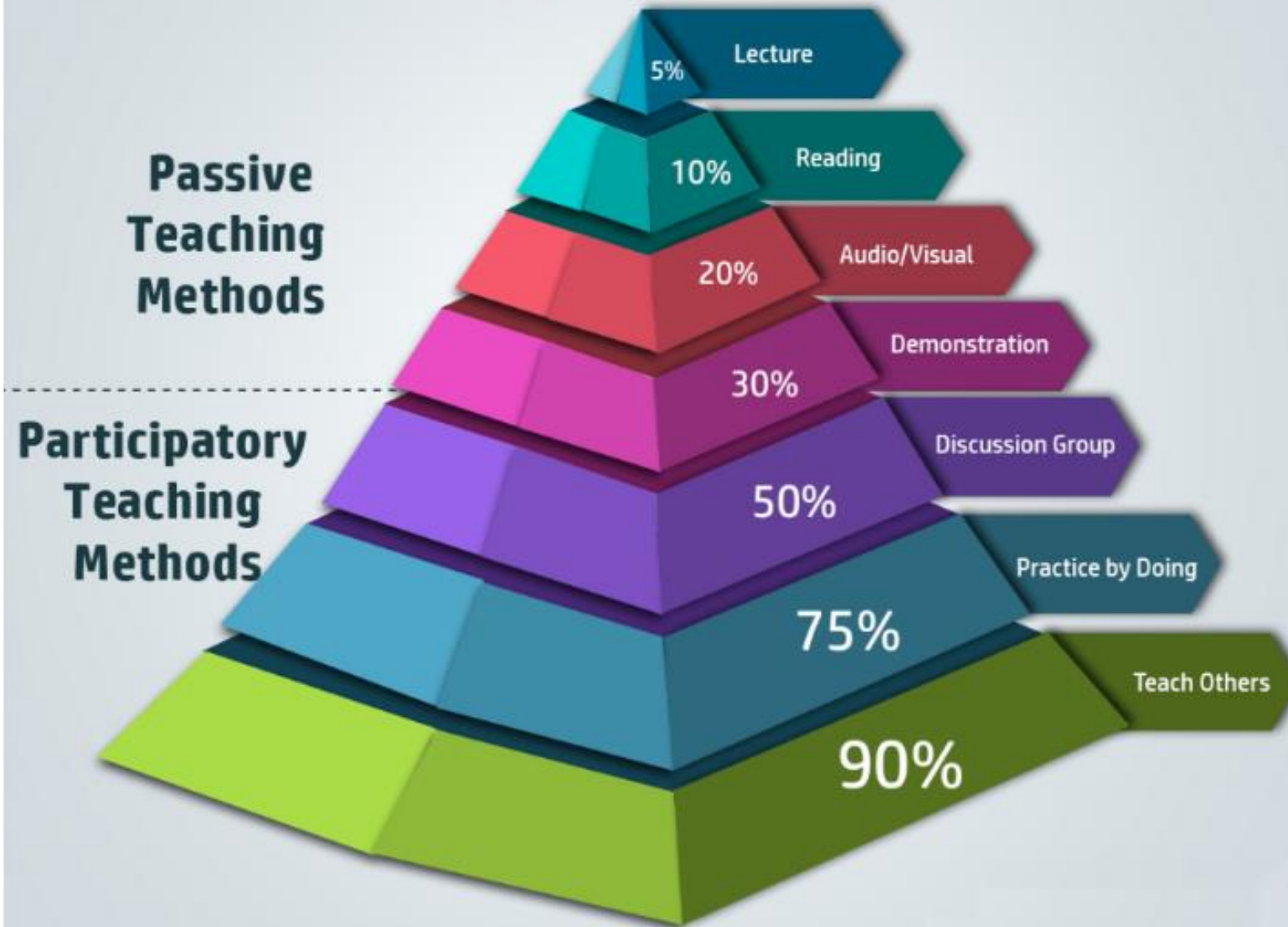
- *Do not suppose that because you loose your voice from lecturing for 90 minutes straight, it is any benefit to the students*
- *The Fact that YOU were taught by the old method, doesn't mean that it is the best for YOUR many students in the 21st century.*



This is a picture of a classroom. There is one teacher in the picture. That is the teacher. There are

THE LEARNING PYRAMID

KNOWLEDGE RETENTION RATES



The Luddites



The Luddites Strike Again: Electric Vehicles Edition

 Guest Author  March 28, 2023  Economic Opportunity

the use of certain types of automated machinery due to concerns relating to worker pay and output quality

Don't be a **digital luddite** at ICDI

- Do not think that if you record all your lectures university will have no need for you!
- If it held true students could learn just by watching YouTube. They cant!
- Because only teacher can guide, engage expand, etc. PRACTICE



If you are afraid of technology, then stop watching YouTube/Netflix 😊. Quit Online banking. FB, Line, Zoom Meetings..etc

Business And Society

AI Won't Replace Humans — But Humans With AI Will Replace Humans Without AI

August 4, 2023

The New



FLIP ICDI © from a problem, to a solution

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



ef·fi·cient

/ə'fiSHənt/

adjective

(especially of a system or machine) achieving maximum productivity with minimum wasted effort or expense.

"fluorescent lamps are efficient at converting electricity into light"

Similar:

well organized

methodical

systematic

structured

well planned

logical



learning methods i.e.
more *efficient*



Benefits of the new method

- **Enhanced Engagement:** Active learning reduces disengagement.
- **Support for ESL Students:** Re-watch lectures with subtitles to improve understanding.
- **Improved Comprehension:** Mini-quizzes reinforce foundational concepts.
- **Flexibility:** Students can revisit lectures for clarity and exam prep.
- **Time Efficiency:** Focus on critical areas needing attention during class.
- **Language Practice:** More student presentations to enhance English skills.
- **Resource Reusability:** Reuse lectures for future courses.
- **Collaboration:** Co-teachers can share recording duties to balance workload.
- **Student-Centric:** Identify and support struggling students early.



WE ARE I.C.D.I



- **Solution**- Curriculum Reform: Revise the curriculum to focus on essential skills, including critical thinking, digital literacy, and lifelong learning, to better prepare students for future challenges.



"My father used to
say- 'Do not rob your
students of knowledge'
"

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



ef·fi·cient

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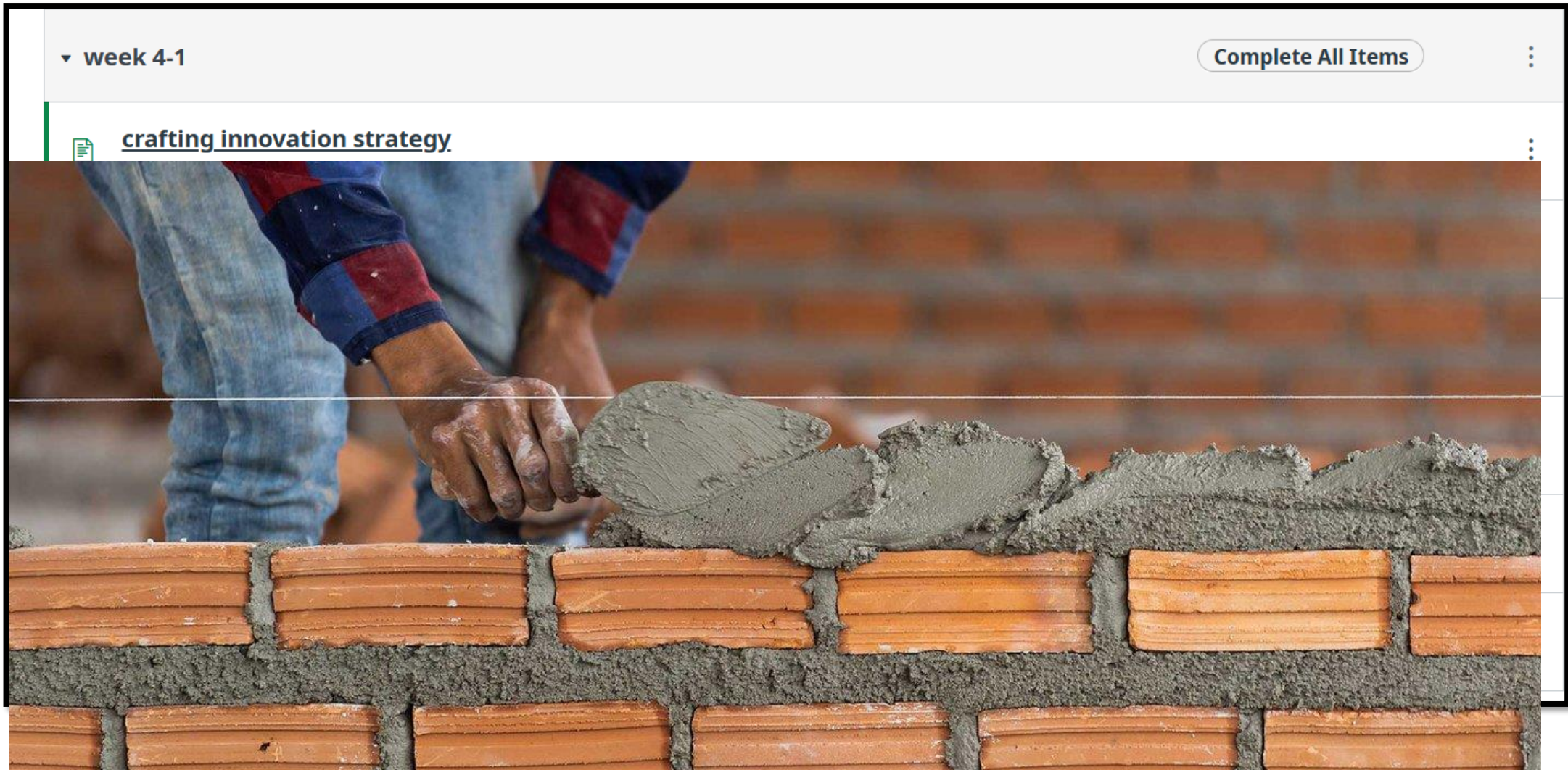
well planned

logical



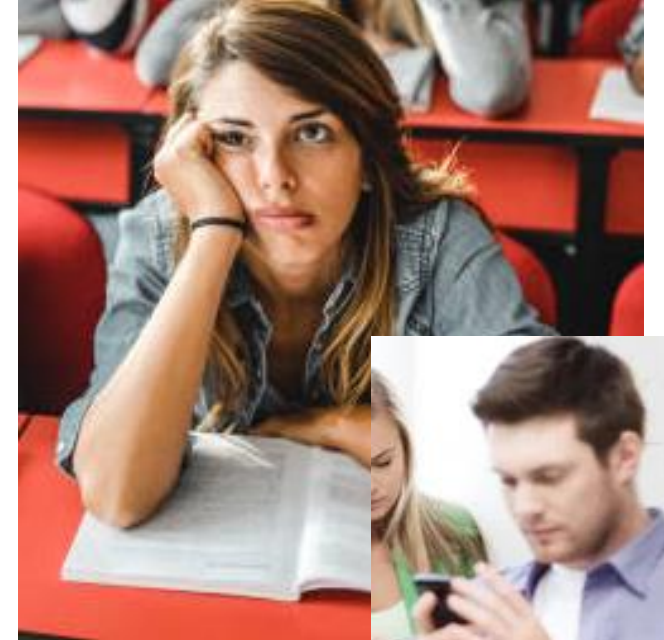
Dr Siva Chandra Ramesh

How to do it at ICDI CMU?



Challenges

- Lectures are not used to recording lectures
preparation do once, reuse next time
Tech issues ask for help
- Students are not used to be active in class ----they better get used
 - Students not responsible to DO HOMEWORK---control them
 - Small rooms with 35 students Solution???



CMU Support

CMU 21st Application Procedures

- คุณโครงการส่งเสริมการจัดการเรียนรู้แบบใหม่ที่สอดคล้องกับศตวรรษที่ 21 (ABC) •

ภาคการศึกษาที่ 2 ปีการศึกษา 2565

A	B	C	O	Micro teaching	สิทธิพิเศษ ในเทอม 2/65
คุณโครงการส่งเสริม การจัดการเรียนรู้ แบบใหม่ที่สอดคล้อง กับศตวรรษที่ 21	คุณโครงการส่งเสริม การจัดการเรียนรู้ แบบใหม่ที่สอดคล้อง กับศตวรรษที่ 21	คุณโครงการส่งเสริม การจัดการเรียนรู้ แบบใหม่ที่สอดคล้อง กับศตวรรษที่ 21	คุณโครงการส่งเสริม การจัดการเรียนรู้ แบบใหม่ที่สอดคล้อง กับศตวรรษที่ 21	คุณโครงการส่งเสริม การจัดการเรียนรู้ แบบใหม่ที่สอดคล้อง กับศตวรรษที่ 21	สมัครยื่นรับรองสมรรถนะ รับวงเงินงบประมาณ เพิ่ม 10,000 บาท
TYPE A 30,000.- Active Learning พิเศษ Track A+ มี Coach ให้คำปรึกษาการสอน	TYPE B 50,000.- Active Learning Flipped Classroom พิเศษ Track B+ มี Coach ให้คำปรึกษาการสอน	TYPE C 80,000.- Active Learning บูรณาการข้ามกระบวนวิชา พิเศษ Track C+ มี Coach ให้คำปรึกษาการสอน	TYPE O 40,000.- Outcome Base Learning Active Learning พิเศษ Track O+ มี Coach ให้คำปรึกษาการสอน	TYPE Microteaching 5,000.- ฝึกปฏิบัติการสอน เสมือนจริงในรูปแบบ จำลอง	

Conclusion: Why education method has to stay the same, WHEN EVERYTHING ELSE HAS CHANGED?

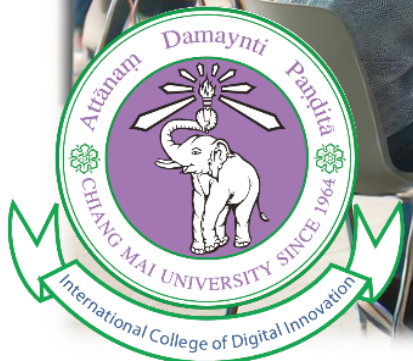
a particular form of procedure for accomplishing or approaching something



Try *Flipping* one week, Lesson or just one lecture



- you can put it on YTB for all or only for ICDI (**YouTube Standard License or Creative Commons License**)
- You can transcribe and publish a book
- You can use it for



ICDI International College of
DIGITAL INNOVATION
CHANG MAI UNIVERSITY



FLIP ICDI ©



Q and A