Introduction to Digital Transformation
(ZZ-1103)

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Self Introduction

- **BSc(Eng)Hons** (1985) : University of Moratuwa, Sri Lanka
- **MPhil** (1989) : Open University of Sri Lanka
- **MEng** (1992) : University of Tokyo, Japan
- **PhD** (1995) : University of Tokyo, Japan
- **PDF – Post Doctoral Fellow** (1995 to 1997) : Advanced Telecommunications Research Center (ATR), Kyoto, Japan
- **Assistant Professor** (1997 to 2003) : National University of Singapore (NUS)
- **Senior Lecturer** (2003 to 2007) : IIST, Massey University, Palmerston North, New Zealand
- **Visiting Associate Professor** (Oct 2006 to Dec 2006)**:** University of Tokyo Japan
- **Associate Professor** (Aug 2007 to Jan 2013) : Universiti Brunei Darussalam (UBD)
- **Professor** (Jan 2013 to Dec 2021) : Universiti Brunei Darussalam (UBD)
- **Senior Professor** (From Dec 2021) : Universiti Brunei Darussalam (UBD)
- **MIEEE**'1997, **SrMIEEE**'2004

Module Contents

Module Code	ZZ-1103			
Module Title	Introduction to Digital Transformation			
Degree/Diploma	Bachelor of Digital Science			
Type of Module	Degree Core			
Modular Credits	4	**Total Student Workload**	10	hours/week
		Contact Hours	4	hours/week
Prerequisite	None			
Anti-requisite	None			

Aims

Students will learn using digital technologies to create new or modify existing businesses. The module aims to teach digital innovation to understand potential of the technology to reshape company business.

Learning Outcomes

On successful completion of this module, a student will be expected to be able to:

Lower order:	20%	- understand digital transformation process - understand digital disruption - understand mechanics of digital transformation
Middle order:	30%	- apply digital transformation workflow - apply technology tools in business processes for digital transformation - analyse and apply digital transformation for a company
Higher order:	50%	- evaluate processes to apply digital transformation - evaluate new or existing business processes for digital transformation - evaluate critical factors of digital transformation

Module Contents

- Introduction to Digital Transformation: Path to digital transformation, Strategy; Fourth Industrial Revolution; Strategic Agility
- Disruption: Mechanics of Disruption; Technology-Enabled Disruptions; Online Business Models; Competitive Advantage with Information Capabilities
- Critical Factors: Teamwork; Process; Information; Transformation; Culture; Risk management; Common transformation risks
- Technology usage: Cloud computing; Mobile computing; Blockchain; Augmented, Virtual, and Mixed Reality; Internet of Things; Artificial Intelligence, Big Data

Assessment	Formative Assessment	Interactive Quizzes and Feedback
	Summative Assessment	Examination: 30%
		Coursework: 70% - Two Class Tests (30%) - Two Class Quizzes (10%) - One Individual Oral Presentation (15%) - One Individual Project (15%)

Path to Digital Transformation

- **Definition:** Digital Transformation is the integration of digital technology into all areas of a business, fundamentally changing how you operate and deliver value to customers.
- **Stages**:
  - **Digitization:** Converting information from analog to digital.
  - **Digitalization:** Using digital data to simplify processes.
  - **Digital Transformation:** Leveraging digital technologies to create new or modify existing business processes and customer experiences.

Strategy

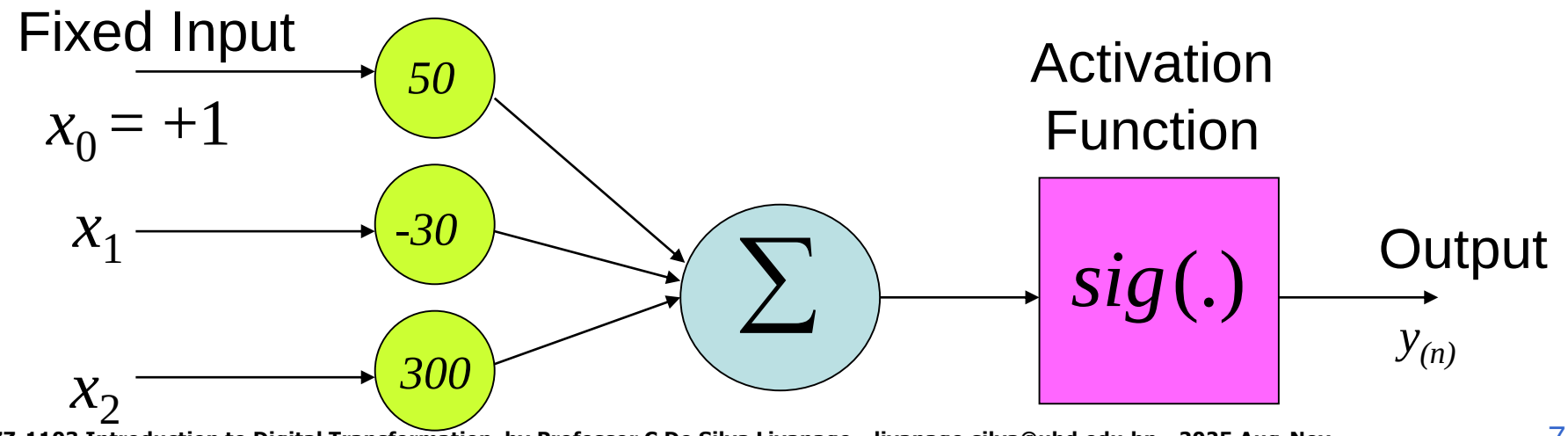
- **Strategic Components:**
  - **Vision and Leadership:** Clear vision from top management is crucial.
  - **Customer-Centric Approach:** Focus on enhancing customer experiences.
  - **Technology Integration:** Seamlessly integrating new technologies.
  - **Continuous Improvement:** Ongoing innovation and adaptation.

Fourth Industrial Revolution

- **Characteristics:**
  - **Technologies:** AI, robotics, IoT, 3D printing, quantum computing.
  - **Impact:** Blurring lines between physical, digital, and biological spheres.
  - **Examples:** Smart factories, autonomous vehicles, personalized medicine.
  - Quiz 1 Exponential Evolution of Technology

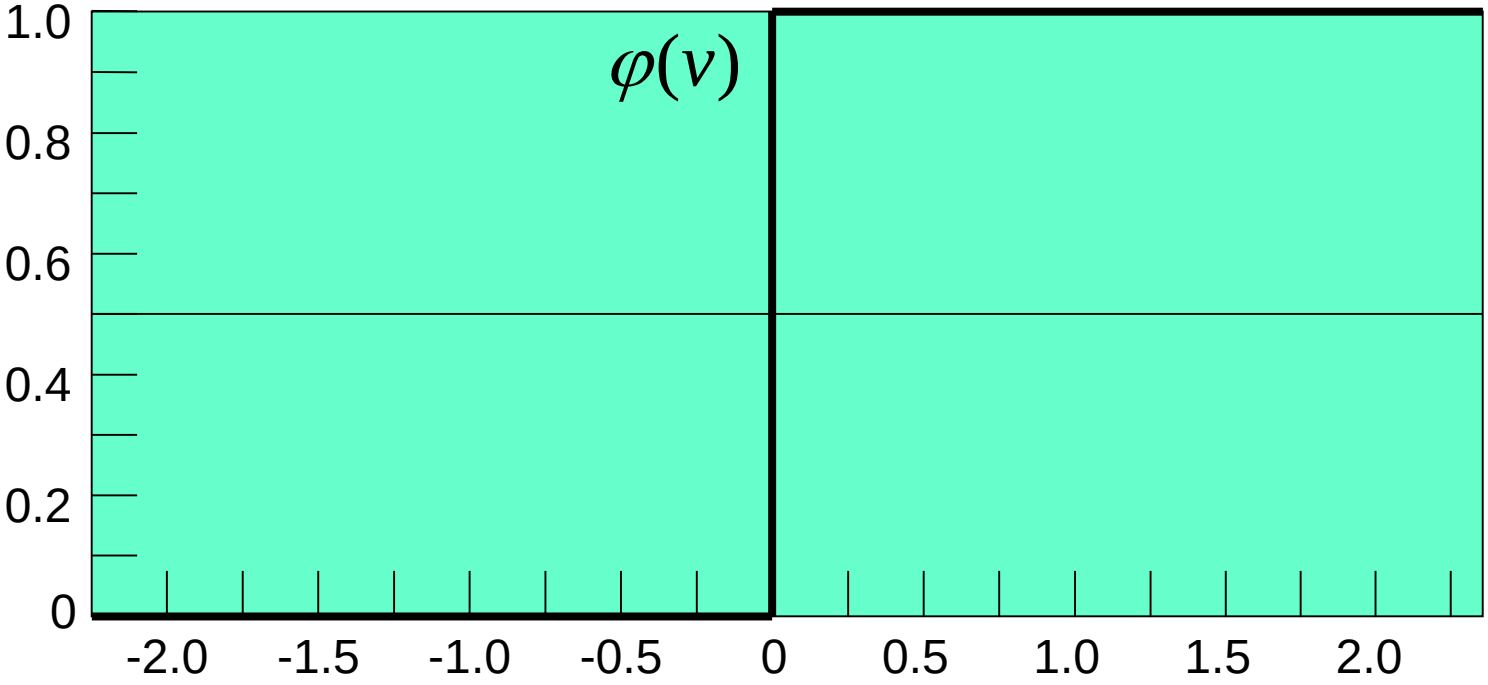
Artificial Neural Networks

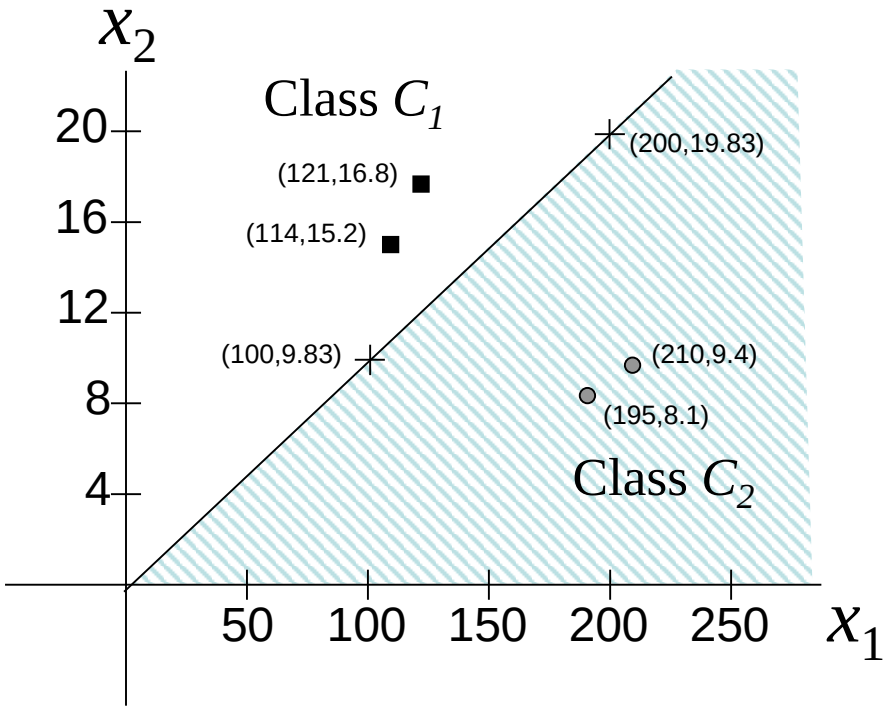
	Weight (grams)	Length (cm)
Fruit 1	121	16.8
	114	15.2
Fruit 2	210	9.4
	195	8.1



Heaviside Function

$$\varphi(v) = \begin{cases} 1 & \text{if } v \geq 0 \\ 0 & \text{if } v < 0 \end{cases}$$




x_2
Class C_1
20
16
12
8
4
(121,16.8)
(114,15.2)
(200,19.83)
(100,9.83)
(210,9.4)
(195,8.1)
Class C_2
50
100
150
200
250
x_1

Strategic Agility

- **Essentials:**
  - **Flexibility:** Ability to quickly adapt to market changes.
  - **Innovation:** Encouraging creative problem-solving and new ideas.
  - **Resilience:** Building robust systems to withstand disruptions.

Mechanics of Disruption

- **Understanding Disruption:**
  - **Mechanics:** Rapid change in technology or market conditions that significantly alters industry dynamics.
  - **Examples:** Blockbuster vs. Netflix, Traditional taxis vs. Uber.
  - Quiz 2: Deconstruction of the Value Chain

Technology-Enabled Disruptions

- **Key Drivers:**
  - **AI and Machine Learning:** Automating tasks, gaining insights from data.
  - **Blockchain:** Secure and transparent transactions.
  - **IoT:** Connected devices providing real-time data.

Online Business Models

- **Models:**
  - **E-commerce:** Online retail (e.g., Amazon).
  - **Subscription:** Recurring revenue (e.g., Netflix, Spotify).
  - **Freemium:** Basic services free, premium charged (e.g., LinkedIn).

- **Utilizing Data:**
  - **Analytics:** Deriving actionable insights.
  - **Data-Driven Decision Making:** Informed strategic choices.
  - **Customer Insights:** Personalizing services/products.

Critical Factors for Successful Transformation

- **Components:**
  - **Teamwork:** Collaboration across departments.
  - **Process:** Streamlined and efficient workflows.
  - **Information:** Leveraging accurate data.
  - **Transformation:** Holistic change management.
  - **Culture:** Fostering a digital-first mindset.
  - **Risk Management:** Identifying and mitigating risks.

Common Transformation Risks

- **Potential Pitfalls:**
  - **Resistance to Change:** Lack of buy-in from employees.
  - **Security Threats:** Increased vulnerability to cyber-attacks.
  - **Implementation Failures:** Poor planning and execution.

Technology Usage

- **Key Technologies:**
  - **Cloud Computing:** Scalable and flexible resources.
  - **Mobile Computing:** Anywhere, anytime access.
  - **Blockchain:** Secure and decentralized transactions.
  - **AR/VR/MR:** Enhanced interactive experiences.
  - **IoT:** Connected devices and systems.
  - **AI:** Intelligent automation and insights.
  - **Big Data:** Handling and analyzing vast datasets.

Conclusion

- **Summary:**
  - **Digital Transformation:** Essential for staying competitive.
  - **Strategic Planning:** Crucial for successful implementation.
  - **Embrace Change:** Continuous learning and adaptation.
  - **Technology:** Leverage emerging technologies for innovation.