WESTERN SYDNEY
UNIVERSITY

Centre for
Smart Modern Construction

THE JOINING UP CONSTRUCTION CONVERSATION

METHODOLOGY FOR ESTIMATING EMBODIED CARBON THROUGH A DISTRIBUTED LEDGER PLATFORM FOR CONSTRUCTION SUPPLY CHAINS

WSU TEAM

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Supervisory Panel

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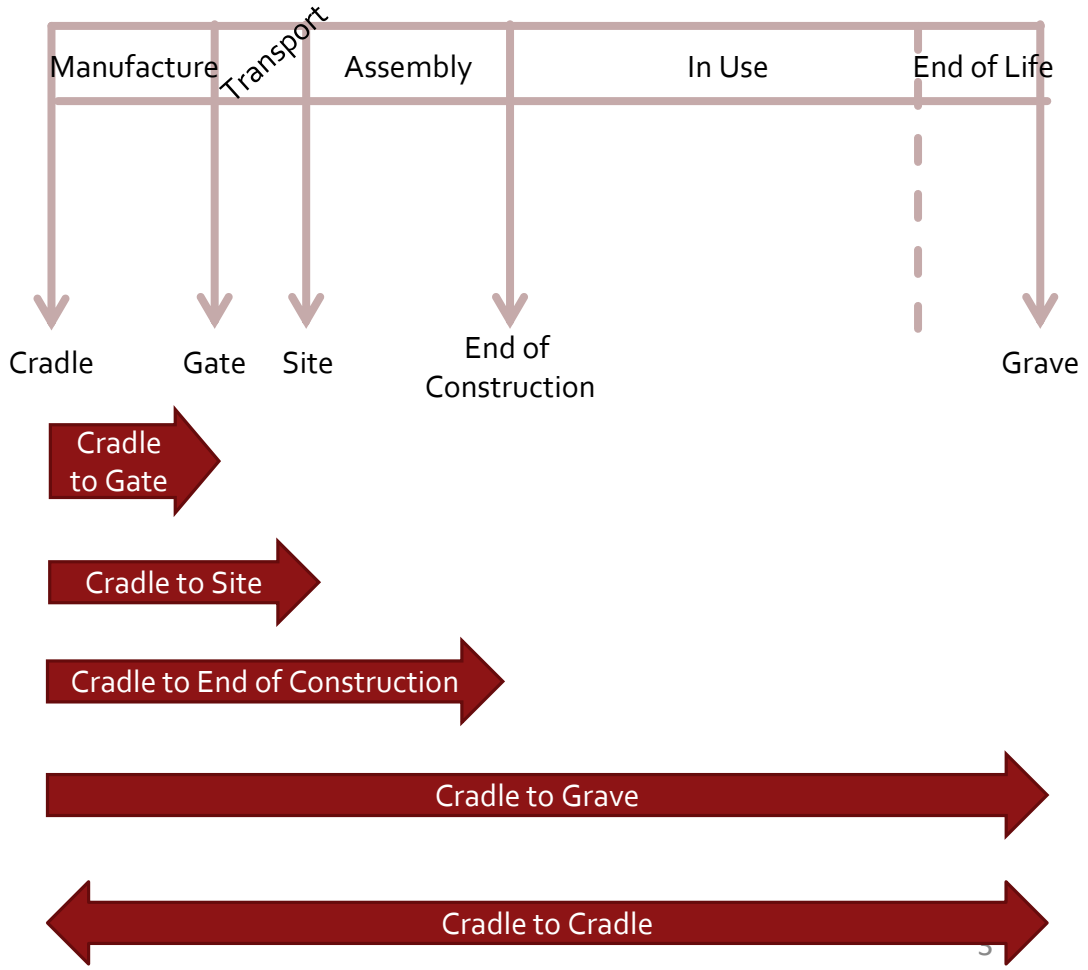
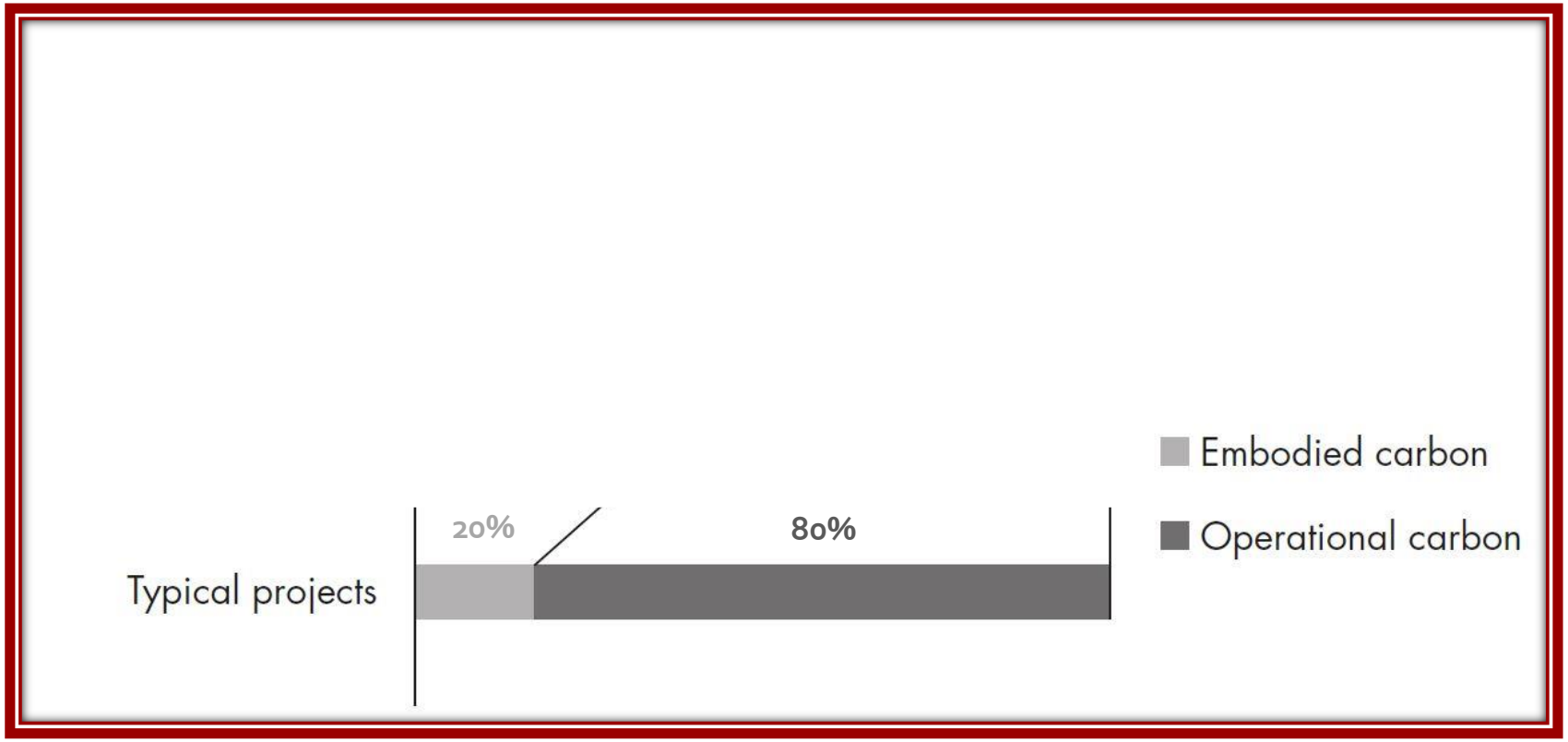
BACKGROUND

- Life cycle carbon;
  - Embodied carbon (EC)
  - Operational carbon (OC)
- Operational Carbon - Emitted during the operational phase of a building
- Embodied Carbon - Emitted during the production process of a product/service within the system boundaries

System boundaries for estimating embodied carbon
Source : Ashworth and Perera 2015





The ratio of embodied carbon to operational carbon during implementation of energy efficient buildings
Source : adapted from RICS 2014, Ashworth and Perera 2015

SUPPLY CHAIN AND VALUE CHAIN

- The Supply Chain for the Installation of a Drainage System

Land Developer

Contract

Construction Company

Hume Pipe Manufacturer

Transport

$ CO_2

Trench Excavation

$$ CO_2 CO_2

Compacting

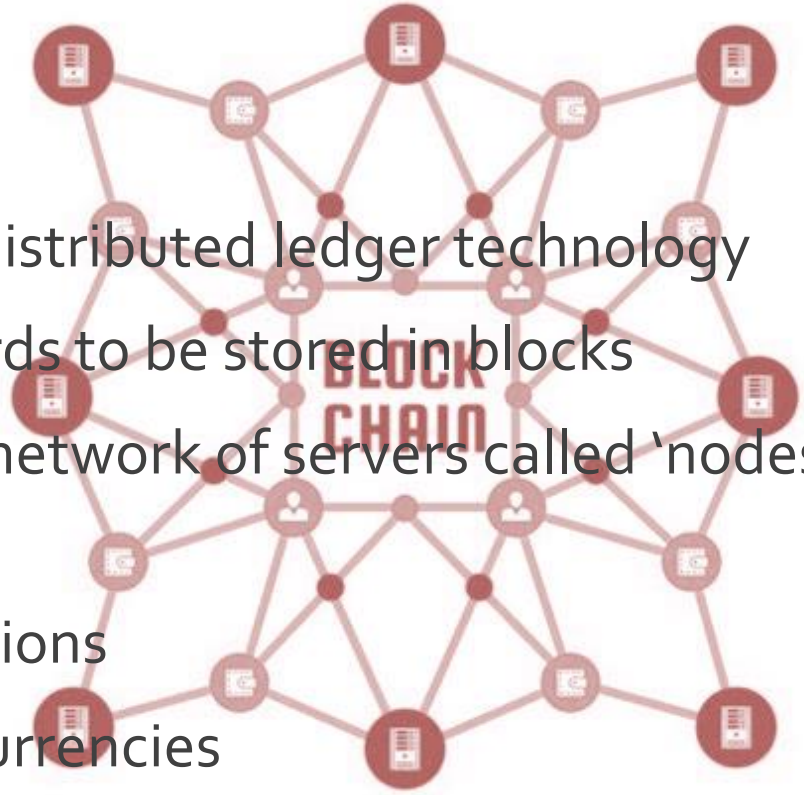
$$$ CO_2 CO_2 CO_2

Laying of Hume Pipes

$$ $$ CO_2 CO_2 CO_2 CO_2

Backfilling and Compacting

RESEARCH PROBLEM



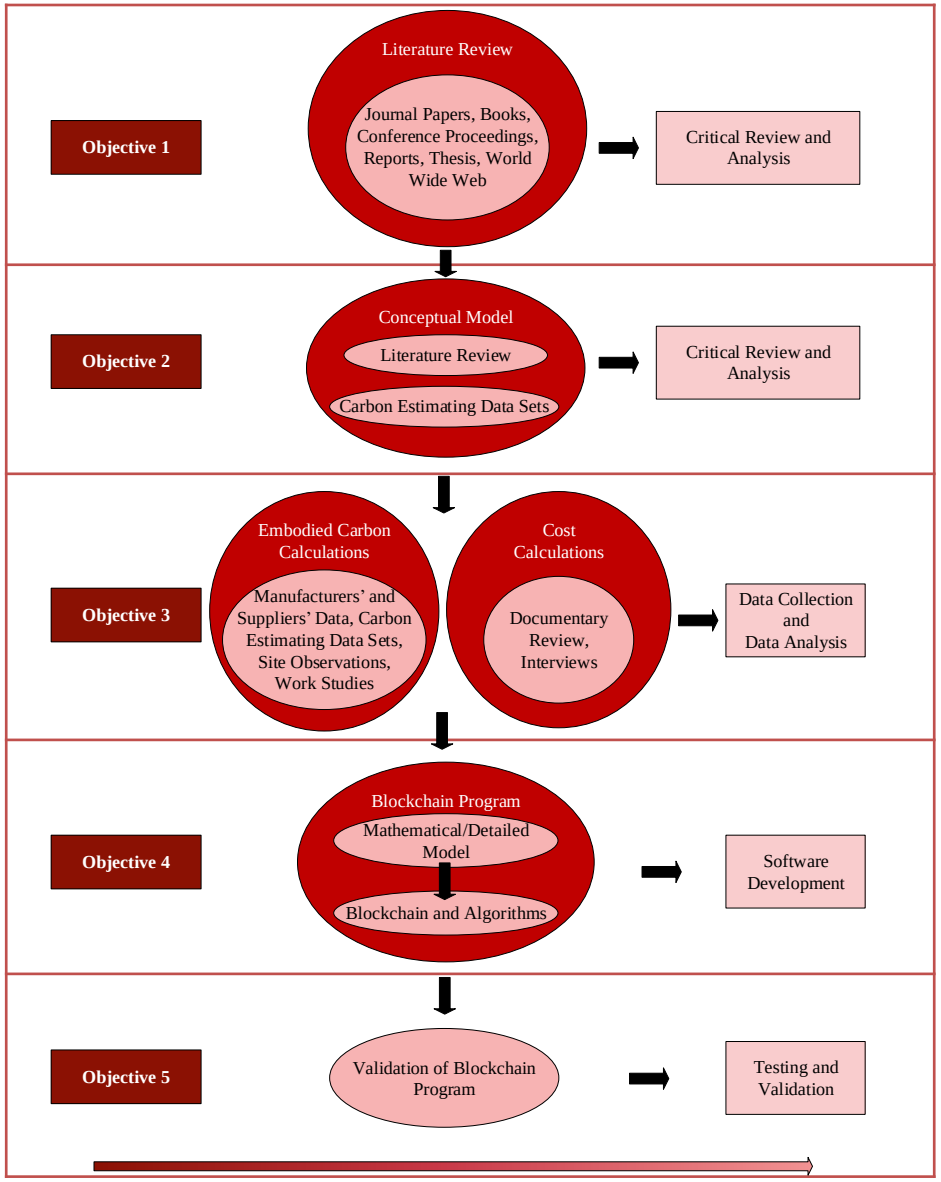
- Blockchain
  - A decentralized distributed ledger technology
  - Enables the records to be stored in blocks
  - Maintained on a network of servers called 'nodes'

- Blockchain Applications
  - Level 1 - Cryptocurrencies
  - Level 2 - Economic, market and financial applications
  - Level 3 - Applications beyond currency, finance and markets

AIM

- To develop a **methodology** for **estimating embodied carbon** using the **value chain concept** implemented through a **distributed ledger platform** for **construction supply chains**

RESEARCH METHODOLOGY



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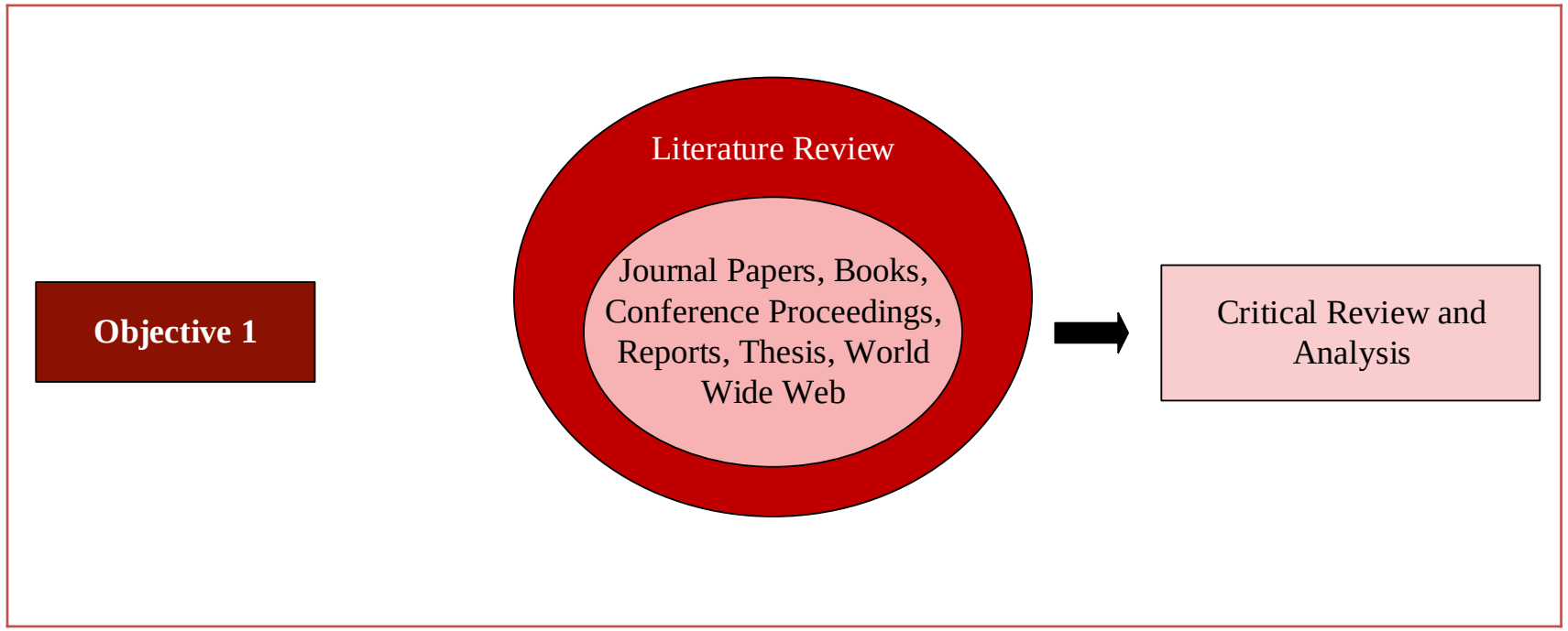

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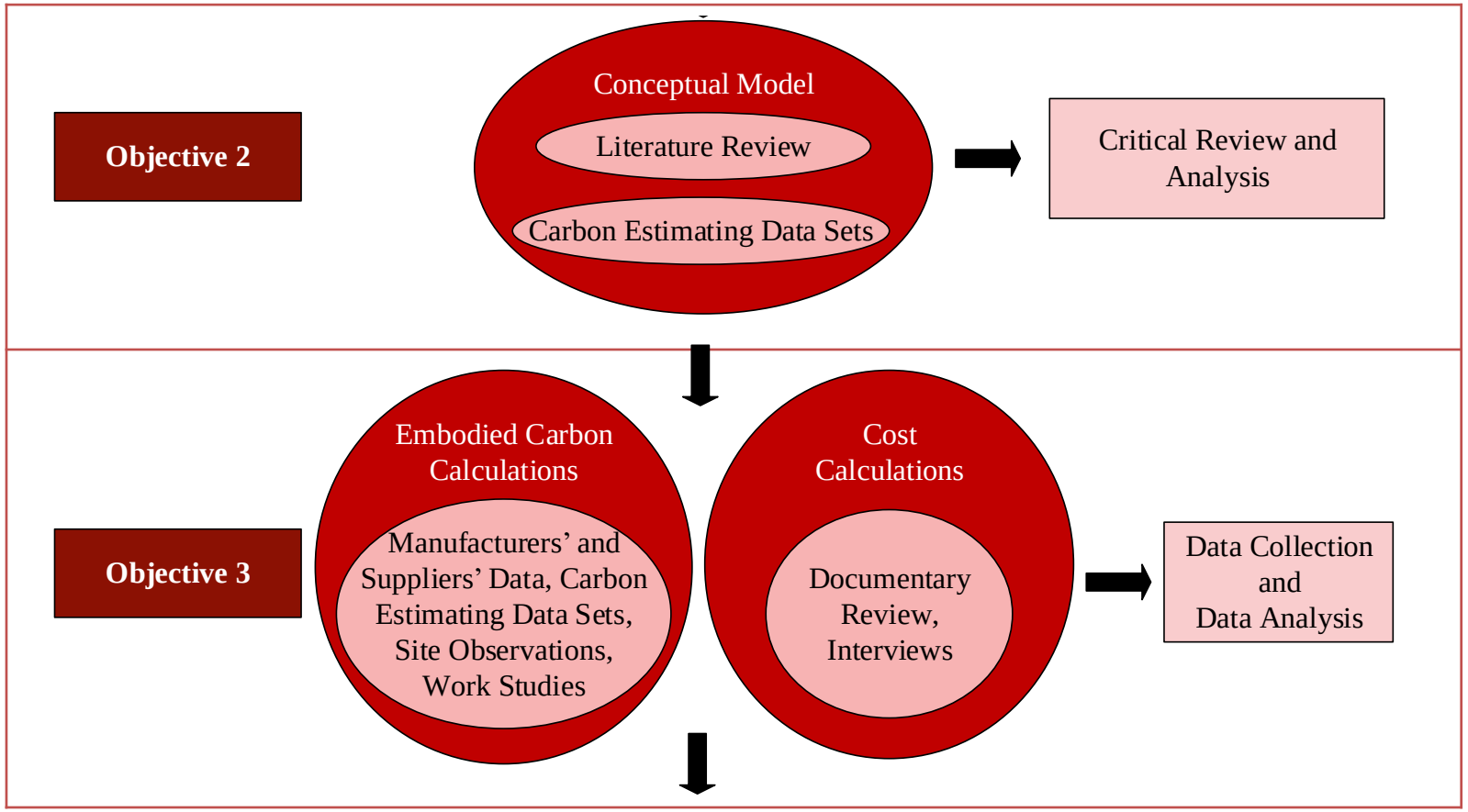

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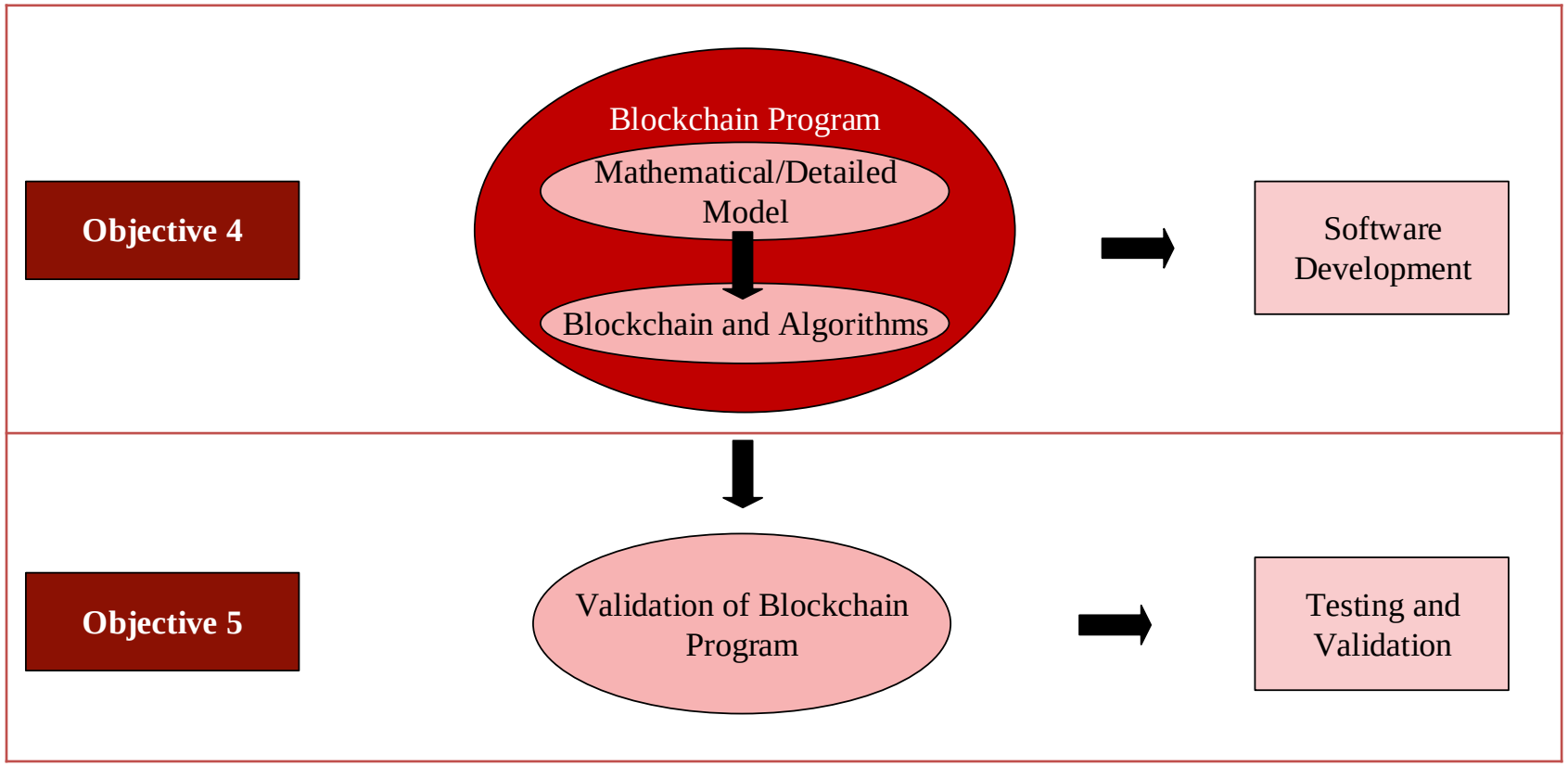

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