


IPIC 2023

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Physical Internet-driven last mile delivery: Performance requirements across people, processes, and technology

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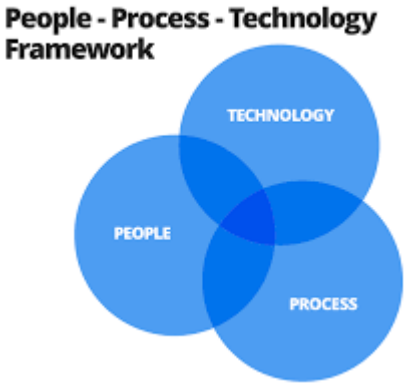
Last Mile Delivery Challenges

- accounts for 40% of delivery costs
  - congested urban areas
  - dealing with traffic
  - finding appropriate parking
- is responsible for 20% of urban traffic
- e-commerce has made deliveries smaller and more frequent
- in-practice
  - idle capacity assets
  - poor use of modes
  - inadequate business systems

about this research



scope

- develop a theory-based framework for PI-driven LMD – PPT Theory
- analyse performance requirements from the perspective of PPT
  - people
  - process
  - technology
- literature review - ongoing work
- PI aspects to consider:
  - standardization of containers and protocols
  - logistics providers collaboration
  - ability to share resources

approach

- identify the interactions of people, process, and technology to bring better performance outcomes in PI-driven LMD based on PPT Theory
- systematic literature review (SLR)
- 39 studies were considered after two screening stages
- thematic analysis was pursued to identify requirements according to the PPT framework
- performance outcomes were extracted through setting propositions

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findings - people

- understanding of new technologies and being able to use them effectively
- mutliple aspects of skills require to be covered
- handling robotics and automation interactions
- customer-service skills
- appropreate training

People

- IT and digital skills
- Availability of skilled workforce
- Adaptability to change
- Customer-service skills
- Health, safety, and security training

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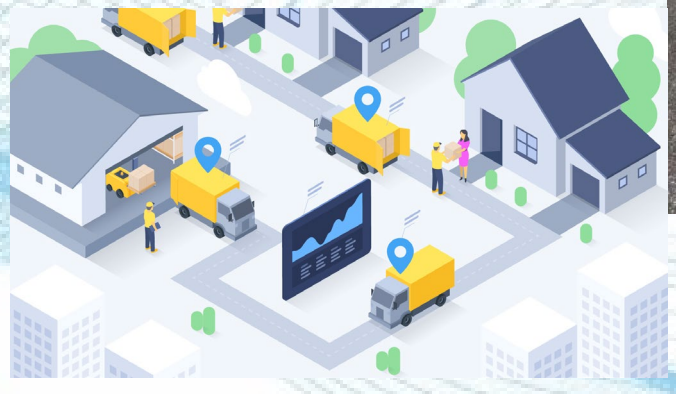
findings - process

- process adaptaion is different for B2B and B2C
- standardization of processes and data is key
- real-time tracking & monitoring drives smart decision making:
  - robustness/ flexibility
  - effectiveness
- **processes integration**
- multiple delivery channels
  - include drones, droids, autonomous robots
- comprehensive services
  - crowdsourcing, mobile parcel lockers

Process

- Standardised processes and data exchanges
- Real-time tracking and monitoring
- Flexible delivery options
- Adopting new delivery services



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findings - technology

- self-organizing logistics systems
  - reduction of operational costs
- mobile applications
- digital platforms
- optimized deployment of services/ coverage

Technology

- Automatization
- Robotization
- Optimization
- Digitalization

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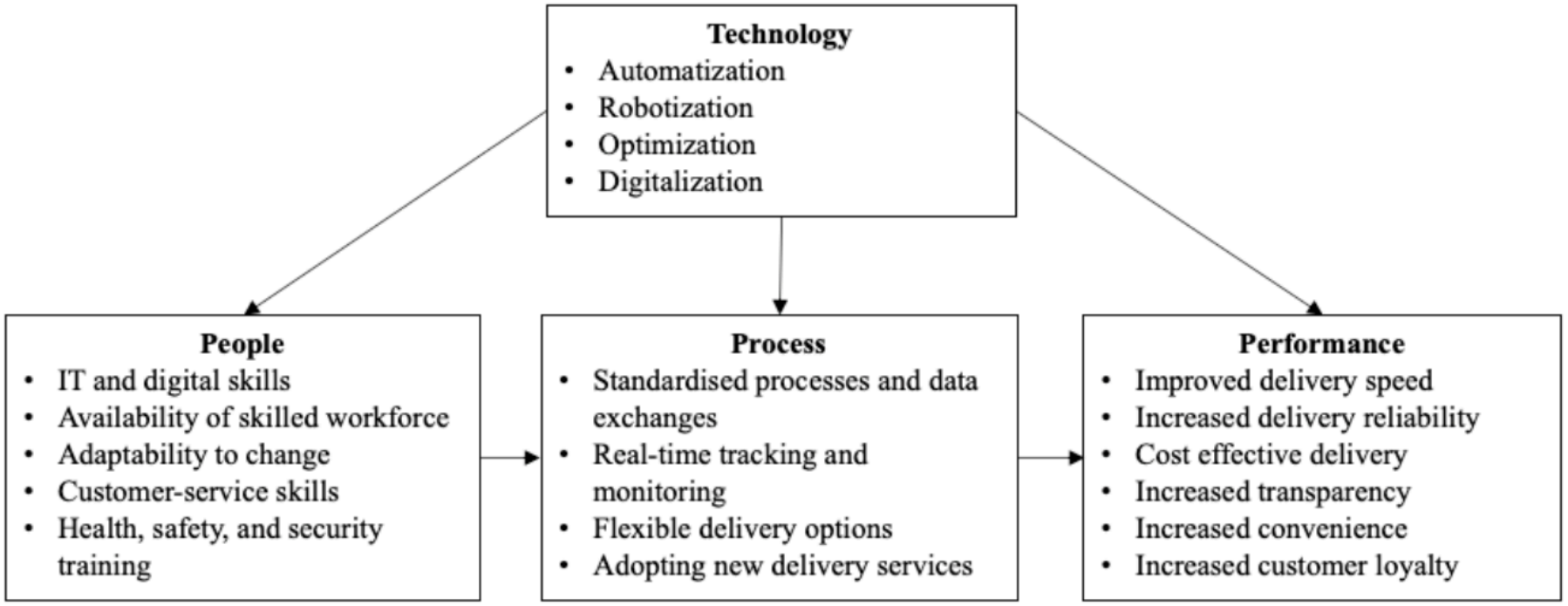
findings - performance



concluding remarks

- theory-based framework for PI-driven LMD performance requirements
- test research propositions in real-world case studies of URBANE via LLs
  - micro-consolidation
  - GPS/ monitoring capabilities
  - smart operational/ tactical decision making

thank you!

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