The effects of artificial intelligence technologies on postal operators

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Introduction

Technological transition for incumbent postal operators

Incumbent postal operators, for some having centuries of existence, already experienced several technological transitions.


Deployment of alternative communication transmission networks, such as telecommunication and Internet services, have particularly affected them.

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Diversification and new technological transition

To address this situation, some have diversified from their historical activity by seeking to mutualize their infrastructures with other products.

Mail delivery networks	Post offices services
Mail delivery + • Voluminous items (e.g., parcels) • Specific constraints items (e.g., meals, medicines) • Proximity services	Mail collection + • Banking and insurance services • Telecom services

In this context, new transformative technologies, broadly referred as artificial intelligence (AI), are affecting postal operators in **all these activities**.

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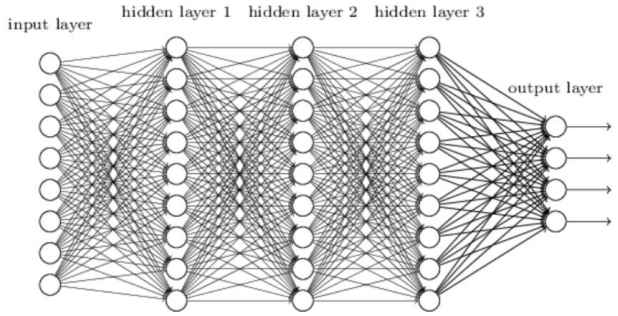
AI technologies

AI technologies aim to create machines capable of performing **cognitive tasks traditionally conducted by humans**, such as perception, reasoning or action.

- **Machine learning techniques** enable a machine to learn how to perform a task, such as learn to recognize faces or objects, from examples without being explicitly programmed to do so.



There are source of huge benefits but generate also important challenges.

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The benefits of AI for postal operators

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AI potential benefits for postal operators

1. **Current activities :** provide better predictions, assist decisions, optimize processes, notably through automation, and enable personalized services.
2. **Opportunities :** develop new activities or enter in new sectors.

Postal operators can optimize their **logistics processes** and improve their **customer relationships and services**.

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AI applications in postal logistics

	Automation and Optimization of
Sorting systems	Mail and parcels flow according to destination or size.
Object manipulation systems	Industrial robots allowing unloading and loading items.
Autonomous transportation systems	Operations through the deployment of mobile robots in warehouses, post offices, and roadways.
Information systems	Planning and operational activities.
Internet of things	Deliverying through the introduction of smart mailbox, smarter postal buildings, smart bicycle.

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AI applications in customer relations and services

Information services	Enhanced automation for precise, real-time order processing and delivery.
Knowledge systems	Enriched information collection, e.g., during a phone call.
Assistances services	Personalized guidance and responsive customer support provided by chatbots, assisting customers with their inquiries and directing them towards adapted products (e.g., in banking).
Personalized content	Cost-effective production of personalized and creative content through generative content AI.

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The challenges of adopting AI technologies for postal operators

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The economic costs of AI adoption

The decision to adopt an AI technology will be driven by the **benefits** it can provide to the operator versus **its costs** and **available alternatives**.

AI costs

- Investment, operational and maintenance costs.
- Compatibility issues with legacy equipment.
- Machine safety requirements.

Available alternatives, in particular labor.

In high-wage regions, investments in AI logistic automatization may be profitable, while in low-wage regions, it may not be.

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Supervising cost of AI potential risks

AI-based solutions may have:

1) **Unexpected misbehavior:** generate inconsistent, wrong, or dangerous decisions (e.g., loan discrimination or autonomous vehicle accident).

- Misspecification of the AI's objective function.
- Insufficient or biased data.

2) **Negative environmental impact:** significant use of resources and energy.

Self-regulation: intrinsic motivations to control these risks (e.g., reputation, or trust of their stakeholders); adoption of ethical and frugal charters.

Regulation: impose minimum rules with legal sanctions (e.g., AI Act).

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Incumbent postal operators disadvantage on their AI adoption decision

Incumbents / Universal service operators can be facing additional obstacles

- Public service missions
- Historical and social legacies

→ Regulatory constraints, Higher costs, Political and public pressure

→ Reduced flexibility and commercial freedom

→ Lower automation potential

Firms with less constraints can benefit from a virtuous dynamic

More automation

→ ↗ Productivity

→ ↘ Price

→ ↗ Demand

→ ↗ Market share

→ ↗ Employment

For example, in the Netherlands, firms that have adopted automation through robots, compared to equivalent firms that do not adopt robots

- Their output increase by about 14.9%,
- Employment in hours worked increases by 4.3%.

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The task delegation decision

	AI technologies	Humans
Potential tasks that can be carried out and its comparative advantage	• Standardized, routine or predictable tasks. • No obligation related to working conditions or human needs. • Work continuously in extreme conditions.	• Complex physical, social or cognitive dexterity tasks • Skills to cope with unusual situations. • Handling multiple tasks of different kinds simultaneously or planning. • Identify ways to improve things.
Examples	Legal, accounting, data processing, postal operators' logistics warehouse operation and planning.	Mail and parcel carrier, public direct relationship and complex issues.

AI technologies may destroy, create but transform jobs by displacing or complement workers.

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AI heterogeneous effects on postal workers

	Wage effects	Working conditions effects
+	↗ Productivity gain (especially for workers with AI complementary skills).	↘ Repetitive and routine tasks. ↗ Efforts on tasks on high human skills.
-	↘ Required skills for certain tasks.	↗ Monitoring of workers' performance. ↗ Cognitive overload. ↘ Human skills (e.g., social relationships, know-how, and autonomy).

Jobs loss > job creation ⇒ Potential technological unemployment.

- One additional robot per thousand workers : ↘ the employment-to-population ratio by 0.2 percentage points and wages by 0.42% (Acemoglu and Restrepo, 2020).

This could be exacerbated by the AI adoption choice : the most detrimental mimic human capabilities without substantial gains in productivity.

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Take away

1. AI technologies generate **important benefices** for postal operators.
2. Postal operators should consider the full costs and implications of AI. There is a **risk of excessive automation** leading to an unbalanced period for workers. They are also at a **relative disadvantage** in adopting these technologies compared to their competitors.
3. Postal operators can be proponents of a **balanced and responsible adoption of AI**, focusing on AI solutions that significantly improve the services provided.
4. Public authorities must implement **fair measures** to achieve a gradual and adapted **technological transition**.
5. Next ? Need to think about what **new products** postal operators could offer **for the common good**.

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THANK YOU FOR YOUR ATTENTION !

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