Beyond IoT – is it time for IfT (the Internet for Things)

1. Summary

The document introduces a concept called "The Wishing Table" (TWT), a futuristic infrastructure for robotic door-to-door delivery. It is designed to address unmet needs in last-mile delivery of goods, especially in densely populated urban environments. TWT utilizes robotic vehicles traveling through modular duct systems to connect residential and commercial spaces, enabling fast, cost-effective, and automated goods delivery.

A case study based in the Fužine neighborhood in Ljubljana outlines how TWT infrastructure could be implemented, including estimated costs (€4,500 per unit) and maintenance (€34/month). The system is projected to offer economic benefits, such as savings on parcel delivery and garbage collection, along with a 4.7% return on investment.

Beyond financial gains, TWT promises social and urban improvements like better recycling, reduced street traffic, and enhanced independence for elderly residents. It also supports peer-to-peer delivery, contributing to local micro-economies and national GDP growth.

The document compares TWT favorably against potential competitors like drones and humanoid robots, citing their limitations in urban delivery. The vision is for TWT to expand gradually, connecting “islands of automation” throughout cities. The conclusion asserts that TWT is a feasible and beneficial infrastructure project for modern urban life.

2. Introduction

There are a number of human needs that have long been served by some kind of public network like water supply, sewage, electricity, telephone and the most recent - the internet. The need for goods that can't flow through some kind of a pipe has been until now partially served by regular mail, door-to-door parcel services, pizza boys and so on. A major portion of the need to go and fetch ordinary goods individuals and families use or consume daily is still uncovered by any public service. So, probably, people mostly satisfy their need for groceries and packaged goods by walking and driving to the nearest grocery or some other shop not because they like to do it, but because there hasn't been any service on the local market yet that would either do it economically, promptly or do it at all.

A concept for a robotic door-to-door delivery system named “The Wishing Table” (TWT) has been developed. Roughly speaking, the TWT system is based on robotic vehicles, a modular guideway, and connected terminal mailboxes. The robotic vehicle is designed to fit into the narrow cross-section of ducts comprising the guideway. The guideway is a basic, simplistic mechanical construction with no moving parts, making it inexpensive to build and maintain. It consists of a modular network of ducts, shafts, and open spaces laid inside and outside buildings, similar to existing HVAC systems. It connects households and office units with businesses, enabling the transfer of goods in all directions using robotic vehicles. Terminal mailboxes are endpoints of the guideway where goods are temporarily stored, automatically uploaded or downloaded to/from the robotic vehicles, and collected or posted by the recipients or senders.

A prototype of the robotic vehicle has been built and tested in a laboratory-like setup. Using wheels with standard inflatable tires, the current prototype can travel up to 30 km/h along

straight and mildly curved sections of the guideway — with even higher speeds potentially achievable. On flat open spaces (like warehouse floors), sharp turns, and horizontal intersections, the robotic vehicle uses Mecanum wheels, enabling movement in any direction and 360° turns on the spot. In vertical sections, the robot employs a patent-pending "central gravity-generated normal force linkage mechanism", using two driving wheels and friction (or potentially a rack and pinion mechanism) to ascend or descend. More info here: www.thewishingtable.info.

3. A case study

A tentative design of the TWT system has been envisioned for Fužine, a densely populated urban neighborhood in Ljubljana, the capital of Slovenia. With 4,500 apartments and around 18,000 residents, Fužine is the largest residential neighborhood in the city. It comprises three squares with 8 to 12-story blocks and smaller 6-story blocks behind them. The area also includes shops, a library, a health center, two primary schools, and one secondary school. The total area is 61 hectares.

3.1. Infrastructure investment

The TWT infrastructure for Fužine case study consists of main trunks, building connections, in-building ducting, and terminal mailboxes. Business terminals (i.e. loading/unloading facilities) are excluded from cost estimates, as they are not expected to burden residential units.

Main trunks follow the street layout and reach within 26 meters of every major residential building. Both trunks and connection channels are laid underground. Thus, cost estimates are based on known underground sewer replacement project costs.

In-building ducting costs are estimated based on HVAC duct installations, and terminal mailbox costs are educated estimates.

Cost estimates are based on two different AI tools and the higher of values has been adopted.

The raw data is in a separate excel file.

The total infrastructure cost is projected at €4,500 per residential or office unit.

3.2. Maintenance

Maintenance is divided into mechanical and computer components:

- Mechanical: estimated based on the monthly cost of fresh water supply and sewage collection
- Computer: estimated based on a basic mobile phone subscription

Total monthly maintenance cost: €34 per unit, or €408 per year

3.3. ROI calculation

The TWT system eliminates the labor cost of last-mile delivery, which should eventually reduce parcel service and food delivery fees — estimated at €570/year per unit. Additionally, TWT takes over garbage disposal, removing the need for street collection — saving an estimated €48/year.

Return on Investment (ROI) per unit:

(pecuniary benefits – operational costs)/investment-> (618-408)/4500*100 = 4,7%.

4. TWT benefits beyond ROI

4.1. Personal:

- Faster delivery
- 24/7 service availability
- Easy returns
- Peer-to-peer delivery
- Comfortable garbage disposal
- Increased autonomy for elderly people

4.2. Urban:

- Improved recycling
- Reduced street traffic

4.3. National:

- Potential GDP increase

Speed of Delivery
TWT delivery is faster than even the speediest delivery personnel. Robotic vehicles using the TWT guideway system face no traffic lights, pedestrian interruptions, or congestion. Once at the building, there's no delay for parking, entry, elevators, or hallway navigation —significantly outpacing human delivery.

Servicing Hours
Low operational costs make 24/7 delivery feasible. Automated goods (e.g., vending machine products) are available 24/7 at no extra cost and human-prepared goods (like meals) become more available as demand grows due to no extra delivery costs.

Return traffic
Simplifying returns increases user confidence in online shopping.

Direct (C2C) Traffic
Subscribers can send items directly to each other — enabling micro-economies, voluntary exchanges, and local collaboration.

Comfortable Garbage Disposal
Each apartment's TWT mailbox also functions as a waste terminal. Garbage can be sorted by category or placed in color-coded bags and sent directly to recycling centers.

Autonomy of Elderly People
Aging populations struggle with mobility. TWT supports independent living by simplifying food and goods access, delaying the need for assisted living.

Improved Recycling
With terminals located nearby, users are more likely to sort waste. Identifiable waste parcels offer cities the opportunity to enforce greener policies.

Reduced Street Traffic

TWT reduces traffic related to food delivery and, to a lesser degree, courier services — minimizing congestion and emissions

Increased GDP
Many people have valuable but non-commercialized skills. A low-cost, peer-to-peer delivery network like TWT can activate these micro-skills into economic exchange, ultimately increasing GDP.

5. Competition

Narrowly speaking, there is no such service on the market, yet. Broadly speaking the idea of TWT competes not just against the existing parcel services and curriers but also against drones and since recently also against humanoid robots. Parcel services and curriers are expensive and not just heavily dependent on the existing means of transportation but also a contributor to their congestions and CO2 footprint. Drones aren't reliable in all weather conditions nor can they deliver within buildings. At the moment their operations don't meet the basic air traffic safety standards, though this obstacle may be removed in the future. Their weakness is also their comparable energy inefficiency in lifting loads and their comparable considerable size needed to carry heavier loads.
Even though drones have evolved very rapidly in the recent years, one just can't imagine that drones would replace any of the known building infrastructure systems to reduce the investment cost of a new building. Like for instance a new building designed with no water pipes and no sewage. Instead the building would be designed with drones to transport water tanks in one direction and buckets of human excrement to the recycling centers in the other.
Much of the same can be said for humanoid robots. They won't replace any of the existing utility services. Their simultaneous usage of the existing corridors, passages and elevators next to humans is yet to be determined and even then such transport will be limited to the speed of walking on stairways and corridors and to using the known means of traffic on streets with all the known drawbacks.

6. Vision

The case study of the Fužine project can be seen as a seed example that would spark other similar projects around the city, each of them built on its own terms but using the same technology and standards. After a while such "islands of automation" would be interconnected through various means like high speed underground channels, the usual batch van transport using highways, drone transport picking up parcels in one neighborhood, crossing the perimeters of a city and delivering them to the heliport in another neighborhood.

7. Conclusion

A case has been made for »The Wishing Table« or shorter TWT, a new type of infrastructure particularly suited for densely populated city areas. TWT promises to make lives of ordinary people easier. It has the potential to reduce street traffic and improve recycling. It is friendly to elderly population. It does require infrastructure and the initial investment, however, it was shown that it is economically viable even when considering only direct financial costs &benefits.

So, I ask you, is it time for IfT (the Internet for Things)?