



MIT SCALE RESEARCH REPORT

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This reprint is intended to communicate research results of innovative supply chain research completed by faculty, researchers, and students of the Global SCALE Network, thereby contributing to the greater public knowledge about supply chains.

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Assessment of retrofitting containers into instant health care outpatient units

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Assessment of retrofitting containers into instant health care outpatient units

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EXECUTIVE SUMMARY

Retrofitting containers into portable instant outpatient health care units, to offer treatment to populations in need, either in disaster zones or in inhospitable areas, would effectively re-utilize idle containers around the world. The intention of this thesis is to analyze how to materialize this concept in order to create an organization devoted to send portable clinics to populations in need.

As world trade increases, the number of containers utilized for shipping cargo increases as well. The number of containers coming from Asia to the US and Europe largely exceeds those traveling in the opposite direction. This is called container-trade imbalance. Since the cost of re-sending these excess containers back to their point of origin to be re-utilized is significantly larger than the cost of keeping them idle in a transportation hub (airport, port, and distribution centers) these metal boxes lie empty and unused around the world.

- **Container imbalance:** In 2005 13.9 million TEUs (twenty-foot equivalent unit) traveled the route Asia-US, while only 4.3 million TEUs did it in the opposite direction.
- **Cost of re-sending:** Resending a container back to its point of origin costs about \$3,500.

In 2005, a “Doc-in-a-Box” prototype was built, by the Renselaer Polytechnic Institute, in cooperation with the Council for Foreign Relations. Their idea was to build portable health care units to serve communities with lack of such resources, or to place in disaster zones, around the world. There are millions of people in need of treatment for diseases for which exist vaccines (tuberculosis, malaria, hepatitis and HIV), but poor countries and NGOs lack infrastructure to deliver them.

- **HIV/AIDS:** Approximately 40 million people around the world are living with HIV, and between 4 and 10 million of them have AIDS.
- **Tuberculosis:** An estimated 1.7 million people will die this year of tuberculosis.

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One TEU has an internal volume of 33 m³, which represents enough space to fit two stretchers, one for female and one for male patients, a small refrigerator for the storage of vaccines, food, water or other product that must be kept cool, a desk and cabinets to store medical supplies and instruments. The design needs consider power and water supply systems as well as ventilation and isolation in order to provide autonomy to the TEU. The process, from idle container to health care unit at destination, is composed of:

- **Container collection:** can be done in the following ways:
 - (1) Collect the unloaded container at its in-land destination. This approach would reduce operating costs by sharing the transportation cost with companies served by the container.
 - (2) Collect them from the container yards close to ports around the globe. Empty containers at the port would be collected by a shipping company and shipped to the retrofitting line.
- **Container retrofitting:** Retrofitting specifications include cleaning, repairing, painting, assembling of furniture, electrical wiring, solar panel installation and other tasks needed to build the finished product, which could be completed in one week. These activities can be outsourced or in-house, which would involve more initial capital investment for the organization in charge of organizing the retrofitting of containers.
- **Container delivery:** A shipping company would be responsible for picking up the containers at the retrofitting facility. Shipments would go through a major port to then be shipped to the final destination. Since some small final assembly is required at destination, each order would include detailed instructions on how to assemble retrofitted containers to ensure the proper functioning.
- **Medical Staff:** Paramedics would be drawn from local clinics as to treat people at the portable health care unit location in that case. Another option is to create an alliance with the NGO Doctors without Borders, or the Red Cross, and arrange the delivery of the container plus the arrival of the paramedics.

The analysis conducted shows that having an organization in the business of sending portable health care units to populations-in-need takes little resources and a big effort. Little resources because the best way to do this is by subcontracting all services and coordinate the subcontractors. A big effort because in a first stage the creation of alliances, with companies and NGOs, is vital to achieve a portable health care units at low cost, to acquire the treatments and to know where the healthcare unit should be located.