Importance of standards for fostering the medical devices supply chain

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• Outsourcing of the internal supply chain of hospitals.

• New Information Systems, New Inventory Policies.

• New Process re-engineering.
Actual Doctoral Research stage:

I just finished my Systematic Literature Review:

**RQ1:** What drives inventory management performance within a hospital?

**RQ2:** How different is inventory management performance between developed world and developing world?

Lead Supervisor: Dr. Nicky Yates

Assistant Supervisor: Professor Michael Bourlakis.

Previous research work in lateral transhipments in the blood Supply Chain (NHS, UK)
Findings

RQ1: What drives inventory management performance within a hospital?

1. Inventory Policies (Influenced by RFID and Bar-codes)
2. Information systems (traceability, data standards, RFID)
3. Power and interest of Stakeholders (physicians, regulators)
Findings

RQ2: How different is inventory management performance between developed world and developing world?

1. Information Systems
2. Special Characteristics (interest rates, currencies, cash flow, regulators, local logistics infrastructure, training in Supply Chain)
3. Power and interest of Stakeholders (physicians, regulators)
A need to increase research in healthcare Supply Chain

Number of publications in Academic Journals per literature domain (only peer-review articles)

- Health Care: 4,925,700
- Developing World: 219,494
- Inventory Management: 51,191
- 1,766

Source: The Author.
More about complexity

• The supply chain management of the Hospital is more complex and knowledge-intensive than other traditional Inventory management on five factors (Chen, Preston and Xia, 2013b).

• First the needs of patients are diverse and require of accurate and adequate supplies (Beier, 1995).

• Second, an average hospital uses thousands of items in medical devices, drugs, pharmaceuticals and medical equipment and most of them are of high value and special for handling to avoid obsolescence and spoilage.
• Third, unlike the industry or retail there is a lack of universal product number classification system that helps to identify functional equivalent products that are important for standardisation and synchronisation for the SCM.

• Fourth, supply selections in hospitals are often influenced by physicians and it depends in criteria like training, brand experience and context-specific demands. In the other side, the purchasing areas of the hospitals are disconnected from the decision makers like physicians (Burns and Lee, 2008).

• Fifth, supply products are quickly changing due to innovation in technology and medicine and therefore obsolescence of purchasing items and a large based of suppliers are issues that Supply Chain Management must address
Complexity for medical devices

• “Complexity as previously explained is part of the context of healthcare inventory systems and surely, one of the most complex inventory systems is the management of medical devices for surgical procedures” *The author, SLR Cranfield University*

• The optimization of the logistics of sterilized items has received little attention from Academia (Klundert, Muls and Schadd, 2008).
About surgical related products, the SLR found that complexity is higher mainly because:

1. Many of the patients arrived unexpectedly,

2. The surgery of expected patients evolves in an unexpected manner and therefore the need of extra sterile items could be needed.

3. Complexity of the nets for surgery, there could be lack of sterile items, sterile items that become unsterile.

4. The tailor-made nets that are used by different surgeons. (Klundert, Muls and Schadd, 2008).
For Medical Devices a Hybrid Policy


Source: (Rivard-Royer et al., 2002)
Data Standards help Inventory management policy.

• From Periodic review policy to Continuous review policy
• Benefits are higher to PPI (Physicians preference Items)
• Integration to External Supply Chain enhances Level of Services and Inventory turn-over.

Fig. 5. Illustrative supply chain.
Source: (Volland et al., 2017)
Horizontal inter-arrangements

• The findings of this research were that horizontal inter-arrangements can benefit in better terms hospitals because of pooling the risk.

• From a geographic point of view, operation in a weak logistics service infrastructure can produce higher inventory costs, (in this study almost 40% higher than good logistics infrastructure) (Zepeda, Nyaga and Young, 2016).
In the other hand regulators are important in developing world context. Jarret’s (1998).

The coercive pressure of regulators has had important benefits in other national healthcare agencies (Bhakoo and Choi, 2013).

Mimetic pressure
Normative pressure
Coercive Pressure
Wrap-up

• Data Standards have a enormous potential to foster Medical devices supply chain (PPI).

• In a developing world context Hybrid models could be a good alternative with data standards.

• Sterile Items for Surgery are the complex inventory items in the medical supply chain

• Future trends? Hospital collaboration? Importance of data standards

• Who Should start? Regulators? Vendors? Hospitals?