Boban Vukicevic & Bob Emmerson

Implementing the Internet of Things

Strategy, Implementation and Considerations

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Foreword

In general, the business case for adopting Internet of Things (IoT) technology is more than compelling, it's overwhelming. It's based on the ability of IoT enabled solutions to deliver tangible business benefits such as an increase in operational efficiency, improved product and service performance, enhanced operational agility and the opportunity to create new business models. The overall result is a significant boost to a company's competitive offer and its bottom line.

Figure 1. Impact of IoT on businesses

A key feature of IoT enabled products is that they deliver actionable management information on the products and the environment in which they operate.

Savvy companies who adopt IoT technology early on will be the first to obtain this information and by acting on it they will realize significant benefits and derive huge competitive advantages. And as we witnessed in the earlier era when the Internet was employed as a distribution channel, brand new companies will emerge and become winners, while many established players will be too late to transform, profit and even survive.

The IoT is delivering tangible benefits across the board, in healthcare, utilities, transportation, waste management, smart cities, smart homes, agriculture, retail, manufacturing, automotive, the environment and so on. This indicates that systems based on IoT enabled products are set to exercise a profound impact on individuals, businesses and society.

The proliferation of IoT enabled products and services is enabled by the convergence and intersection of computing and communications technologies, as well as the decreasing costs of various elements of the technology stack such as electronics, connectivity and computing technology. The IoT driven economic developments represent the future of the world economy, i.e. societies, markets and businesses. The way we do things will be so significantly altered that we can talk about creative destruction and creative innovation on a global scale.

There are many publications that cover the profound impact IoT will have on societies and the economy. In addition there are many technical books and papers that focus on the technical aspects. However, there are not many publications that cover the link between the strategic choices the businesses can make when implementing IoT and the requisite technology. The most authoritative publications on this topic are *"How Smart, Connected Products Are Transforming Competition" and "How Smart, Connected Products Are Transforming Companies"* written by Michael E. Porter and James E. Heppelmann and published by the Harvard Business Review. These publications have inspired the authors to go a step further and try to make a comprehensive link between the strategic considerations, the implementation considerations and the core technical aspects of IoT. Our intention was to make a modest contribution that would help entrepreneurs who are considering entering the IoT arena but are uncertain about how to make a compelling business case and how to make a start.

Figure 2 provides an impression of the size of the expected changes that the IoT is bringing.
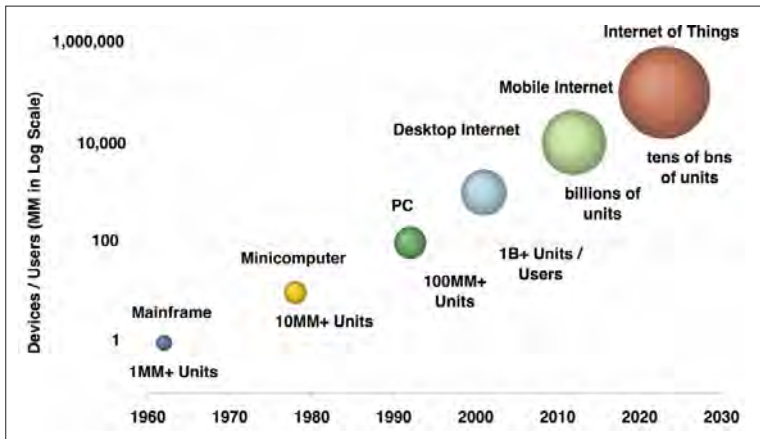

Figure 2. *More Connected Devices on the Planet Today Than People*[1]

1   Silicon Labs. Thomson Reuters, Morgan Stanley

Summary

Chapter 1 addresses the critical business / management issues that arise when discussing IoT implementations. These aspects are often overlooked, particularly in on-line articles and papers, mostly because IoT is still seen as a topic for engineers and IT managers. In this chapter we will provide information on how IoT impacts business strategies and also provide guidelines on how to develop those strategies and make them actionable.

The key concept is finding a strategic IoT Hot Spot that aligns with companies existing and intended competitive advantage. Considering the fact that the IoT development is a potentially disruptive innovation activity, we will elaborate on some ideas and concepts on innovation phases and pitfalls. The chapter closes with some considerations that should be taken into account when developing your business case.

Chapter 2 focuses on IoT-enabled, "Intelligent connected products". It starts by defining the terminology followed by an outline of the benefits they are bringing to businesses and their impact on business environments.

Chapter 3 covers the key enabling technical developments that enable the implementation of IoT projects. We will zoom in on the technology components: sensors, intelligent gateways, data communication protocols, IoT cloud technology, big data analytics and security considerations.

In **Chapter 4** we will remind you on some key concepts we have discussed but also make some additional points on the potential organizational impact of your IoT related decisions.

Chapter 5 provides some useful real-life use cases.

Chapter 1: Defining your IoT strategy

Implementing IoT technology in order to optimize business processes or make and market intelligent connected products will involve a number of significant changes in the way companies conduct their business.

A critical task is to define and debate the requisite business changes in order to ensure that they align with the company's strategy. This process might uncover changes that could have a disruptive impact on the business, thereby indicating the need to refine the strategy and bring everything into alignment.

That said, we can generalize and highlight the fact that changes should be implemented in order to realize two primary goals. One, *cost reduction through process optimization*, e.g. in manufacturing processes via remote monitoring and predictive maintenance, asset management and supply chain optimization. And two, *increased revenues and margins either through sales and marketing process optimization or through new business models* enabled by the development and deployment of IoT enabled intelligent connected products. These developments will necessarily result in improved processes, customer lock-ins, customization and regular updates, enhanced customer experiences, insights into customer behavior, improved pricing management through price sensitivity analysis, data as a revenue source and so on.

Any attempt to introduce a business model that would encompass such a sweeping set of changes would be disruptive; therefore most companies should apply an incremental approach when implementing IoT technology in their products and internal business processes. So, how should you start?

It goes without saying that you should start with a formalized analysis of the impact IoT could have on your company, your products and services, your resources and capabilities, as well as those of your customers and the competition.
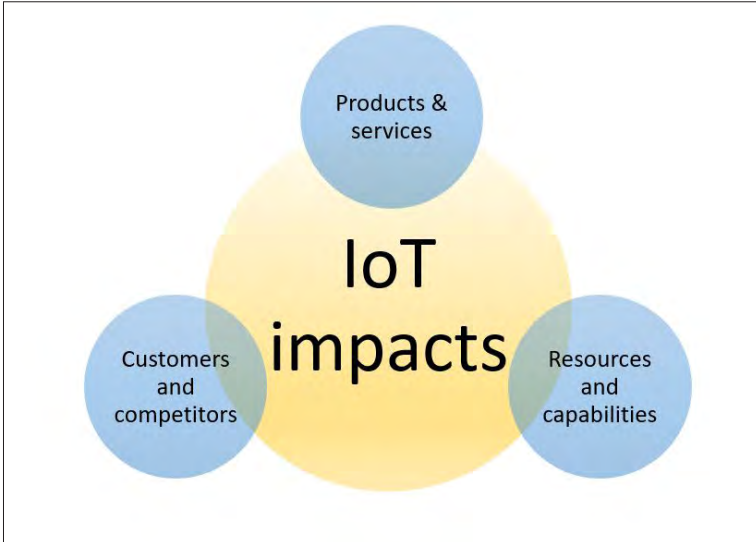

Figure 3. IoT impacts all aspects of your business

You also need to analyze the environment in which your company operates: how the various products and services are consumed; the purchase criteria of your customers and how it is related to different situations and conditions; as well as the locations and times when they are consumed. In addition this process should consider the role your competitors play.
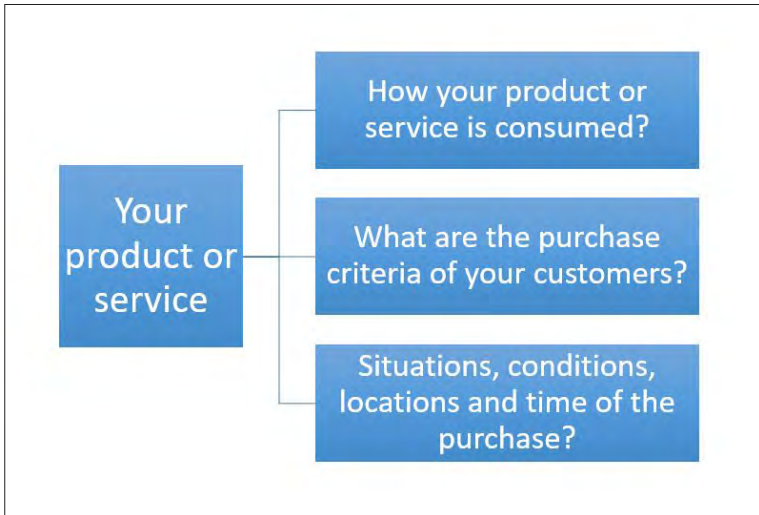
Figure 4. IoT *gives real-time insight in customer behavior*

In this new era you should consider that IoT technology will allow you to interact with your customers and be able to change your product attributes on-the-fly in order to accommodate changing needs. The result will be an improvement in your customers' experience, thereby enhancing stickiness and loyalty.

According to Michael Porter, *"Competitive strategy is about being different. It means deliberately choosing different sets of activities to deliver a unique mix of value."*[2] The perceived value to customers will determine how much they are prepared to pay.

So, if the profits earned by your company depend on *the perceived value of your products*, it is clear that insightful information on perceived values that could be provided by IoT innovation is key to improving your own bargaining position and your profitability.

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2   Porter, Michael E., "Competitive Advantage". 1985, Ch. 1, pp 11-15. The Free Press. New York.