Value Propositions for the Internet of Things: Guidance for Entrepreneurs Selling to Enterprises

David Hudson

> *"It's easy to get sidetracked with technology, and that is the danger, but ultimately you have to see what works with the music and what doesn't. In a lot of cases, less is more. In most cases, less is more."*
>
> Herbie Hancock
> Musician, composer, and actor

This article provides entrepreneurs with guidance to help understand and express the specific and compelling value proposition for their Internet of Things (IoT) offer. IoT enables such a wide range of possible short- and long-term opportunities that IoT entrepreneurs may fall into the trap of considering IoT generally rather than positioning their offer to a buyer in a specific manner that helps win deals. The process of understanding and expressing a compelling value proposition will help the IoT entrepreneur focus their offer, understand who the real buyer is, and demonstrate tangible value to that buyer in a manner that is directed towards winning deals.

Introduction

The Internet of Things (IoT) can be defined as "a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual 'things' have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network." (Vermesan et al., 2009). This and other definitions of IoT are very broad in scope with enormous technology, commercial, societal, and other value chain implications. Such breadth provides the opportunity for innovation, as there are many points where an entrepreneur might apply assets in a novel manner to establish a position in the new value chains that IoT will opportune. Such breadth also creates a pitfall in that IoT entrepreneurs may position their offers as tackling a full vision of IoT-enabled transformation. Moreover, because IoT solutions involve the physical and the virtual, and both operations and information networks, there can be multiple stakeholders involved in procurement. Therefore, it is critical that the entrepreneur knows who is buying and what they will pay for.

Consider an example of an IoT offering for theft prevention for a goods delivery service. Such an offer might use a global positioning system (GPS) receiver linked to a satellite or cellular communication network. A device with these technologies could be mounted on a delivery vehicle and used to locate that vehicle, on demand, should that vehicle be reported as delayed or missing. This is a straightforward IoT-enabled offer.

Such on-demand tracking could be enhanced with geofences whereby the IoT system would immediately raise an alarm should the vehicle deviate from its expected routing. Given real-time knowledge of potential theft, automatic communication with law enforcement agencies could be added. This loss-prevention system could be linked to the real-time routing of a large fleet of vehicles, and it could be used to manage the fleet, to optimize routes and deliveries, to implement service tiers, and even to plan vehicle maintenance. With additional sensors on the doors and packages, an even more sophisticated end-to-end monitoring of high-value cargo could be provided. Other sensors could be introduced to ensure that refrigerated goods were kept at the appropriate temperature throughout shipping and never opened, for example.

Monitoring of acceleration, time of day, and the odometer could be used to assess driver performance, to maintain driver logs, and to conform to legislation governing

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the number of consecutive hours that a driver is permitted to operate their vehicle. All of the above IoT-derived data could be exposed through portals and other interfaces to provide visibility to end customers and other stakeholders in the goods-delivery value chain. Furthermore, the potential exists to monetize this data through the fleet owners, the producers of the goods, shipment brokers, insurers, vehicle vendors, and even the end consumers of the goods.

This example illustrates how a simple IoT use case – asset protection – can be extended to have a set of values that might appeal to a wide variety of potential buyers and operate under a variety of business models. The IoT data is valuable because it can optimize the delivery service, it can be used to improve customer experience, it can be used to monitor directly related aspects of the delivery value chain such as the vehicles and drivers, and it can be used to upsell other products or services. All this is possible because the data provides insight into the operations of the delivery service as well as the habits of that service's users. In this example, a delivery service can ultimately be more valuable because of the IoT data generated than because of the goods moved from one loading dock to another.

IoT entrepreneurs can be tempted to position such a wide vision because it allows so many conversations with so many potential buyers. This wide vision also conforms to the IoT definition above. Indeed, broad claims can be found on many vendors' websites. Tackling a piece of a broader technological and value disruption is a wise move for an entrepreneur, but focusing too much on the wider vision and not enough on specifics leads to a positioning that is neither clear nor compelling relative to the many other IoT vendors competing for deals. Moreover, the entrepreneur must be focused on determining who among the various stakeholders is the decision maker for the initial purchase and what problem that decision maker wishes to solve.

Startups focused on a beachhead or initial entry into the market are unlikely to deliver all the capabilities like those described in the example above, at least not at once or even on their own. Although their target buyers are likely to be interested in such a vision of IoT and business transformation, they will hear "vision" from analysts and other vendors. More importantly, buyers interested in business operations are likely to make purchase decisions based on specific operational outcomes. The IoT entrepreneur must resist the temptation and stay focused on sustainable differentiation and customers willing to pay for such value.

In the author's experience, entrepreneurs operating in the hype-filled IoT space can lose focus or include more and more technology futures and business vision in their value propositions leading to ambiguous and general positioning. As a simple test to check whether they have fallen into this trap, entrepreneurs should ask themselves: What are the two or three value points about my IoT offer that a customer must hear, believe, and remember? What makes those points compelling compared to my competitors' value points?

This article reviews the value proposition literature for approaches to best answering those test questions. The approaches summarized here are most relevant to those IoT entrepreneurs looking to position themselves as delivering clear and compelling value to customers who making purchase decisions for specific capabilities and to understand what makes a value proposition compelling. The focus here is on enterprise rather than consumer applications of IoT insofar as the article addresses transactions where customers procure IoT offers to address business opportunities.

This article includes a review of tools and provides guidance that can assist the IoT entrepreneur to refine their value proposition to make it specific and compelling. These tools can be applied during the development of a venture and periodically during the process of engaging and learning from early customers.

Background

There is considerable market analysis of the size and type of opportunities for IoT vendors. This data reinforces the potential breadth of IoT applications as well as the magnitude of the customer spending in the enterprise market. Analysts have also provided insight into how the overall enterprise IoT market may be parsed into addressable segments. Columbus (2016), for example, highlights that, although IoT does include the potential for game-changing approaches to delivering media, healthcare, financial services, and so on, the areas where there are highest levels of commercial activity include inventory management, mobile/in-transit asset management, industrial equipment maintenance, and remote management of installations. Such analysis emphasizes the extent to which IoT consumption is driven by business operations requirements that tend to be consistent within traditional market verticals. There are common IoT technologies used across verticals, however, buying is often operations driven within a vertical. Market analysis is important, but an IoT entrepreneur will transact with a customer – or just a critical

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few initially – not with an entire market. Some of the market analysis therefore highlights that some customers will be operationally focused in their use of IoT.

The industry hype concerning IoT has also lead to considerable academic discussion. Some of the literature is technology centric, elaborating on architecture and standards (e.g., Uckelmann et al., 2011). Inquiry into the technology is important, of course, because the technology must work if it is to deliver value. The sophistication and complexity of the underlying technology create challenges for realizing worthwhile business models (e.g., Lee & Lee, 2015).

Indeed, innovation in the business model rather than the technology itself is a potential area for entrepreneurs to exploit. Tuber and Smiela (2014) propose several innovative business models. The literature also describes how IoT business models function at an ecosystem level. For example, Westerlund, Leminen, and Rajahonka (2014) examined business model design "under the transition from company-specific business models towards networked and more comprehensive ecosystem business models". The ecosystem effects of IoT reinforce the potential breadth and reach of a wide view of IoT.

As with the market opportunity data, IoT technology and ecosystem contexts are important. However, the IoT entrepreneur looking for that first customer must find their own unique and specific value proposition within the architectures, standards, ecosystems, test beds, and the like. Other vendors, by definition, will be able to lay claim to technology and ecosystem compliance value points.

Just as the Internet itself or industrial revolution did not have a singular value proposition or business case, neither does IoT. As an Internet-enabled capability, end-to-end IoT has and will have multiple transactions or nodes in a value chain to deliver a complete solution. The technology components include the network, sensors, analytics, archives, analytics, etc. The actors include the end customer or customers; the owners of the equipment that provides the raw IoT data; those that gather, store, analyze, and possibly enhance the data; as well as those that monetize the data. Westerlund and colleagues (2014) note that the IoT ecosystem business models are diverse and immature. The breadth of IoT potential can be tempting to the IoT entrepreneur, however, the diversity and immaturity can make reaching a real buyer difficult if there is too much focus on broad positioning or a lack of focus on the correct portion of the value chain.

Within such a value chain view, consider one node or instance of value exchange in the ecosystem. Specifically, consider the enterprise buyer who wants to address a pain point where an IoT solution may apply. An IoT startup may wish to serve this need with an offer. Multiple suppliers are likely to be involved in delivering an IoT solution given that the solution will involve some aspects of the enterprise's operational technology – for example, in manufacturing, healthcare, energy and so on – as well as its networks and other information technologies. Solutions that span multiple enterprise locations and use cases with data captured and stored over long periods of time are likely to involve even more suppliers. An IoT startup must be able to demonstrate its specific and compelling value within the value chain and in the context of essential architectures, standards, and the like.

In the earlier example, there is a full vision of transportation transformation that includes a specific point where GPS and other technology create a node where the value exchange centres on loss prevention. The business model at such an IoT node can be understood as an architecture that identifies the key actors and basis for exchange of value (Glova et al., 2014).

There are different types of actors such as buyers and sellers as well as types of exchange – product sales, service subscriptions, products as services, customizations, and so on. The literature, therefore, guides us from a broad understanding of IoT as an orchestrated set of technologies to the notion of specific value exchanges transacted within the broad vision of industrial change. These types of transactions are considered below.

IoT Business Model Types

Dijkman and co-authors (2015) developed an IoT business model framework based on a literature review, interviews, and surveys. They describe a range of business models with underlying value propositions that include convenience/usability, getting the job done operationally, improving performance of the operation, creating the possibility of later updates, reducing cost, mitigating risk, customization, and so on. Even at the level of specific IoT customer needs and supplier offers, there is a range of underlying value propositions. In other words, two IoT customers might consume the same IoT offer for different reasons, or the same IoT offer might be positioned in different use cases because of a common underlying value proposition.

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Uckelmann and colleagues (2011) also identify a range of value propositions underlying IoT use cases that include business innovation, creation of new services, creation of new, purpose-built IoT devices and interfaces, management of resources, development of new applications, real-time analytics and business intelligence, and supply chain visibility. They describe how the initial customer need for an IoT offer often centres on optimization of current processes and cost reduction leading to a later need to drive new revenue opportunities in IoT – from saving money to making money. Examples of new revenue opportunities are IoT platforms as a service, IoT information service providers, improving the quality of an end-to-end user experience, and real-time analytics. The "making money" aspects of the new revenue opportunities extend to monetizing data outside of what would have been the customer's traditional business model. An IoT offer can optimize current business and enable later opportunities – it "enables incremental business transformation as well as radical business changes" (Uckelmann et al., 2011).

Nagji and Tuff (2012) describe how offers (products or services) may be core, adjacent, or transformational. Core offers incrementally improve existing capabilities and expand existing markets; adjacent offers expand from existing business into "new to the company" business; and transformational offers are breakthroughs for markets that do not yet exist. Taking the core, adjacent, and transformational typography of offers in general as well as the market and academic writing describing ranges of IoT offers, the author proposes an IoT offer may fall into one of three categories:

1. *Core IoT:* operationally focused offers that deliver cost reduction or other business performance improvement through the use of IoT sensors, actuators, and data. Such offers improve the customer's current business.

2. *Adjacent IoT:* offers that allow the customer to leverage the data that their business operation generates to provide new offers themselves. These new offers address a recognized market need and may include selling products as services – for example, selling machine hours as a service versus selling the machines as a product.

3. *Transformational IoT:* offers that allow the customer to create breakthrough offers. As breakthroughs, a new market is to be created, and the offers are likely to depend on novel use of the data generated by IoT. As an example, a traditional product vendor may monetize the data on customer experience of their product or machine learning applied to the IoT data stream may identify new relationships and untapped needs.

A given IoT business offer should fall into one, and possibly more, of these types. There is also a progression inherent in these types, and hence, an offer may initially address a core opportunity but, over time, can be applied to adjacent or transformational opportunities as technologies and customer-adoption progress. This notion of a range or spectrum or apparent and latent customer needs is important to how an IoT startup might position against the opportunity. The startup must position knowing that the customer may make its vendor selection against one set of buying criteria but later recognize and address other needs.

Compelling Value Propositions

Muegge (2012) explains how entrepreneurs can systematically discover their business models. One component of this systematic approach is the development of the stakeholder value propositions. There may be multiple stakeholders involved in any given business and there must be a compelling value proposition for each to participate. The compelling aspect of the value proposition is the basis for the selection of one supplier over the competition.

According to Anderson, Narus, and Van Rossum (2006), compelling value propositions have three attributes:

1. *Distinctive:* the value delivered is superior to the competition.

2. *Measurable:* the value delivered can be quantified in monetary terms.

3. *Sustainable:* the superior, measurable value can be preserved and enhanced for a period of time.

Anderson and co-authors (2006) also provide a method for developing and refining a value proposition so that it is compelling. The central idea in their approach is that suppliers cannot simply list every possible benefit from their offer because competition exists, because customers are skeptical, and because customers often make choices based on specific needs rather than general and broad requirements.

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Discovering the compelling value proposition is done iteratively (Anderson et al., 2006). The entrepreneur identifies, in sequence:

1. *All benefits:* These are all benefits customers may receive from the entrepreneur's offer, considering what is distinctive, measurable, and sustainable about each benefit.

2. *Favourable points of difference:* This is a subset of all benefits and includes only those that are superior to the next best alternative to the entrepreneur's offer. Note that the next best alternative may be status quo – the customer selects no offer or no new offer.

3. *Resonating focus:* This is the shortest subset of the favourable points of difference and includes only those that deliver the greatest value to the customer relative to the next best alternative. Greatest is characterized by the distinctiveness, measurability, and sustainability of the benefits.

Application of this method (Anderson et al., 2006) to an IoT offer can begin with an understanding of market needs as expressed in analyst or other data as well as a broad set of changes that are enabled by IoT technologies. Refinement to the favourable points of difference requires an understanding of what competitors will do over the same timespan as the entrepreneur's plan. Reaching the resonating focus subset requires customer engagement. The entrepreneur should expect to iterate through this process.

The literature on focusing an offer in the IoT space so that it has a compelling value proposition is summarized in Table 1.

Application

The relevance to the entrepreneur of classifying the IoT offer and how to express its most compelling value proposition can be seen by revisiting the earlier example of an IoT offer that minimizes losses due to theft. This offer delivers business performance improvement through prevention of losses and recovery in the event of theft and, hence, is a core IoT offer. The buyer for such an offer is likely to be intensely operational and will understand current (status quo) operations and the cost of loss. The value proposition for such an offer can be expected to have specific measurable performance arguments supported by data such as successful delivery rates. The return on investment for such an offer can also reasonably be linked to the rate at which customers deploy the offer. Customers may also perceive value in that they can charge more for IoT-assured delivery.

Consider a second example where additional data from the process of shipping goods is used to observe real-time customer usage and measure customer experience. Customer experience of a product or service could be inferred using data gathered from the shipping and receiving enterprise resource management systems and the end-to-end shipping process. This customer experience data can be used to understand cus-

Table 1. Key considerations when developing a compelling IoT value proposition

IoT Offer Types		
Core IoT	**Adjacent IoT**	**Transformational IoT**
• Business performance improvement • Cost reduction • Performance improvement	• New offers • Recognized by market	• New offers • New market
Attributes of a Compelling IoT Value Proposition		
Distinctive	**Measurable**	**Sustainable**
How is the IoT offer superior to competing offers and to the status quo?	How is the value of the IoT offer measured in terms of specific operations or business performance improvement, addressable market, or market making?	How is the IoT offer's distinctiveness kept superior to the next best alternative over time?

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tomer habits to drive a sales campaign to focus on highest-value customers. The data could also be used in training of the customers themselves to increase consumption of the shipping service or to create customized shipping offers to meet the needs of specific segments or even customers. Alternatively, such data could be made available to a third party that specializes in such professional services. The core offer to customers would continue to be operationally focused in its value. However, the adjacent offer to create customized service would be new to the market and would likely be of interest to marketing and sales decision makers. The value proposition for this adjacent IoT-enabled offer would depend on measurable attributes; however, decision makers here would pay attention to the distinctiveness and sustainability of the offer.

Finally, consider a transformational IoT offer where sensors that are embedded within a shipping-solution offer also gather environmental and pollution data from the geographies covered by the shipping firms that use the offer. In this instance, there are many potential customers for such a dataset and many potential business models for monetization – governments for policy purposes, enterprises to sell their own offers or manage their own environmental impact, and so on. The value proposition here goes well beyond operations in any one shipping firm and must emphasize how it is sustainable in the marketplace. A buyer here is likely strategically minded and is likely a C-suite decision maker.

Entrepreneurs or managers of those responsible for IoT offers can apply the approaches summarized above to test whether they are positioning a compelling value proposition. Which type of IoT offer is it? Core offers target operationally minded buyers. Transformational offers target those responsible for new business opportunities. Adjacent offers may depend on both types of decision makers. The value propositions for IoT offers of each type are also likely to be different with core IoT delivering operational value and transformational offers enabling new market creation or entry.

The value propositions for the offer also need testing. What is the compelling value proposition? It is a concise set of measurable and sustainable value points that distinguish the offer from the competition. Because these value points are measurable, they can be tested and demonstrated to customers to win business.

These pragmatic steps will assist IoT entrepreneurs in executing successfully in the shortest period.

Conclusion

Any given IoT offer may be able to address core, adjacent, and transformational opportunities and may therefore appeal to operational, marketing, executive, or other buyers. The breadth and scope of IoT in a full vision can encourage taking such wide views. An IoT entrepreneur must, of course, be able to speak to the short and the long term, to the immediate and adjacent opportunities, to the operational pragmatics and the transformational vision. The IoT entrepreneur must also have a systematically developed understanding of what makes their offering better than the competition's, and they must be able to communicate that compelling value proposition.

The guidance from the compelling value proposition literature, however, is to focus on the shortest possible list of distinctive, measurable, and sustainable points of difference for the target buyer. This guidance is particularly critical for entrepreneurs in the IoT space. Building from an entry point of strength will allow IoT entrepreneurs to address increasingly sophisticated opportunities that may span business process improvement through transformational opportunities as well as multiple use cases that span customers, geography, time, or other dimensions.

About the Author

David Hudson is a technology management professional who has 30 years experience in industry and academia. Most recently he led new business incubation within the Chief Technology Office at Dell EMC. He is an Executive in Residence at the University of New Brunswick's Technology Management and Entrepreneurship program. He has been a Lecturer in technology innovation in the MBA program at Carleton University's Eric Sprott School of Business, a Director of Lead to Win, the Chair of the Ontario Centres of Excellence ICT advisory board, and a consultant to technology firms. Previously, he was the Vice President of advanced research and development at Nortel and has had an extensive career in technology business management as well as R&D. David received his Bachelor's and Master's degrees in Systems Design Engineering from the University of Waterloo, Ontario, Canada. His Doctorate is from Carleton University in Ottawa, Canada, where his research focused on employee innovation on-the-job.

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