

Looking Beyond the Product

How Top Companies are Engineering Solutions, Not Just Products, for Competitive Advantage



A Frost & Sullivan White Paper

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INTRODUCTION

Product or technological innovations alone are no longer the only sources of competitive advantage for companies. More companies are developing advantages based on the services, data, relationships, and overall value they can bring to customers in addition to, or even instead of, products themselves. Segments of many industries are already witnessing a transformation away from product to solution-based business models. This important trend demands a different approach to R&D that takes a more holistic and long-term perspective, forcing developers to “engineer outside of the box.”

In this paper, we define and review examples of solutions and the trends driving the “engineering of solutions.” We then examine the challenges companies face in developing solutions-based business models. Finally, we explore how one company has created a novel approach to designing and selling solutions to companies, providing a case study of a business they have helped to “engineer outside of the box.”

SOLUTIONS

In business innovation, a solution

. . . is a customized, integrated combination of products, services, and information that solves a customer problem. Solution innovation creates value for customers through the breadth of assortment and the depth of integration of the different elements.¹

Solution innovations differ from traditional conceptions of innovation. The development of solutions requires a change in focus from product features to product benefits. Companies must ask, “How can we position our product to solve a larger, systemic problem?”

Solutions have most commonly been developed in segments of industry that are more data intensive or may benefit from more data. The value in a solution is tied to data management streams so that customers are able to make better decisions. And companies sometimes tie their business model to the success of the solution for their customers.

Often, a solution is based upon the integration of a product and software for managing data derived from the product. There are numerous examples of solutions already on the market that demonstrate important characteristics of solutions, in general:

- Integrates software with a product.
- Solves a larger systemic problem.
- Includes the gathering and management of data.
- Focuses on product benefits instead of features.

¹ Sawhney, M. et al. “The 12 Different Ways for Companies to Innovate,” MIT Sloan Management Review, Spring 2006:78.

The telematics company *inthink* has developed solutions to improve driver safety and fleet efficiency. The company's original product, Witness[®], a crash data recorder, was used by the insurance industry to prevent losses from fraudulent claims and later by NASCAR[®] to help improve racing safety. In 2006, *inthink* changed its focus from crash data gathering and analysis to crash prevention. It has developed crash-prevention solutions marketed to companies with large fleets, small businesses, families with teen drivers, and motorsports consisting of an on-board computer—the *tiwi*[™], telecommunications, and data management software.

The computer provides verbal mentoring in real time for seat belt usage, speeding, sharp turns, hard stops, and rapid acceleration. The system uses GPS and a database to compare car speed with posted speed limits. It is also able to detect and restrict mobile device usage to prevent driver distractions. Text, phone, or e-mail alerts are sent to designated recipients when unsafe driving occurs and when drivers reach their destination. The service also includes emergency and roadside support. *inthink* provides real-time and historical data through a Web portal for instant feedback and trend analysis. For fleets and small businesses, *inthink* also provides fleet management software.

inthink's solutions use product innovation and software to solve serious problems: injury and death from crashes and the high costs associated with unsafe driving and crashes. It is in the process of securing insurance discounts for users of its solutions. And the company conservatively estimates that it has saved customers more than \$300 million from fewer crashes and greater fleet efficiency.²

In another example, RFID technology, in combination with data management software, is being used across industries to track and manage inventory. Savi Technology, Shipcom Wireless, and KBR Wireless, for example, have joined together to develop a supplies management solution for the oil and gas industry:

KBR Wireless passive RFID tags are affixed to consumables and assets, which are then loaded into Cargo Carrying Units (CCUs) tagged with Savi's own battery-powered RFID sensor tags. Savi's fixed and mobile RFID infrastructures are designed to collect tag data as the assets move through the supply chain to oil and gas production facilities. Savi and Shipcom Wireless integrated software has been developed to process and manage the RFID data, providing real-time visibility and transforming the data into reports, analytics, automated alerts and other actionable knowledge on the location, condition and security of assets and shipments. The system also can utilize environmental sensors to monitor security breaches as well as heat and humidity conditions inside the container that might affect supplies. Real-time information about the contents and security status of the containers also can be integrated into government customs and national security systems.³

² Inthink. http://www.inthinc.com/enterprise_economics/ (March 14, 2011)

³ Nelson, M. "Savi and Partners Launch RFID Solution for Oil and Gas Industry; Wireless System Automatically Tracks and Manages Supplies." <http://www.savi.com/about/press-releases/2009-11-04.php> (March 15, 2011).

RFID technology solutions are showing up in healthcare also, where they are being used to manage inventory as well as keep track of surgical instruments and sponges to prevent them from accidentally being left in a patient during surgery.⁴

TRENDS DRIVING THE ENGINEERING OF SOLUTIONS

There are several trends driving companies to consider solution-based models (see Figure 1). The ultimate result of each trend is a change in the way innovation is conceived and done. Innovation becomes more than technological wizardry, alone, where the development of a remarkable product is the end goal. Innovation, instead, becomes the value and experience created by the product.

Figure 1: Trends Driving the Engineering of Solutions

The expansion of computer, Internet, and telecommunications technology enables collaboration and the resulting creation of innovation ecosystems.

Solutions provide companies with competitive differentiation and new revenue streams.

Demand for transparency and accountability from stakeholders encourages adoption of solutions, which can provide data streams supporting these goals.

1. The expansion of computer, Internet, and telecommunications technology enables collaboration and the resulting creation of innovation ecosystems.

Advances in computer, Internet, and telecommunications technology make collaboration among companies in developing innovations easier, cheaper, and faster than ever before. Companies with different skills and technology expertise can work together in developing products that neither could do alone. These collaborations are natural incubators for solution innovations.

2. Solutions provide companies with competitive differentiation and new revenue streams.

As competition increases, companies begin to look the same:

Companies within an industry tend to pursue the same customers with similar offerings, using undifferentiated capabilities and processes. And they tend to innovate along the same dimensions. In technology-based industries, for example, most firms focus on product R&D. In the chemical or oil and gas industries, the emphasis is on process innovations. And consumer packaged-goods manufacturers tend to concentrate on branding and distribution. But if all firms in an industry are seeking opportunities in the same places, they tend to come up with the same innovations.⁵

⁴ See, for example: Medline. "ClearCount Medical Announces Expanded Never Event Warranty Coverage Provided by CNA HealthPro." Medline Press Release, July 27, 2010. <http://www.medline.com/media-room/press-release.asp?ID=166>, January 28, 2011.

⁵ Sawhney, M. et al. "The 12 Different Ways for Companies to Innovate," MIT Sloan Management Review, Spring 2006: 75.

3. Stakeholders are demanding transparency and accountability from businesses.

The same technologies that enable greater collaboration are also responsible for the greater expectation and need for business transparency and accountability:

No matter what kind of organization you manage, trust is an integral component of your brand. Yet, in a globalized, hyper-networked world where information—good or bad, true or untrue—can go viral in a matter of minutes, trust is under siege. Reputations that took years to build can be lost in seconds. Whether you are trying to prevent a trust-eroding event or repair the damage after one has occurred, transparency is key. No longer a luxury limited to forward-thinking, market-leading organizations, transparency has become a marketplace imperative that is being demanded of all companies by regulators, board members, shareholders, customers, and business partners—in short, all stakeholders.⁶

Businesses across all industries are in need of solutions for developing transparency and accountability without increasing risks.

THE CHALLENGE OF “ENGINEERING SOLUTIONS”

Companies often find it difficult to develop solutions around their products because it takes skills, resources, and technology most companies do not already have in-house. Developing these technology systems and business models requires an understanding of systemic problems, how customers might use a prospective solution in their workflow, and the economic implications of adopting the new solution. Additionally, companies need to have experience in monetizing solutions, which is a very different challenge from traditional revenue models.

Companies wishing to add solutions to their portfolio should consider partnering with an experienced “solutions engineering” company. A partner will be able to devote its skilled resources to developing numerous solution-based options quickly and cost-effectively, giving a company “more shots at the goal.” With this approach, a company would need to expend less of its own R&D resources on ramping up its in-house infrastructure. Instead, it can remain focused on its own core competencies (see Figure 2).

⁶ del Vecchio, S. et al. 2010. “Trust but verify: From transparency to competitive advantage.” View: Risk Assurance (PwC) 13:3.

Figure 2: Advantages of Partnering with a “Solutions Engineering” Company

Access to multidisciplinary expertise needed for developing innovative solutions

Improved innovation

Able to explore more potential solutions—“more shots at the goal”

Lower R&D costs

Faster time to market

Improved productivity

Able to focus on core capabilities

One of the greatest added benefits of establishing a partnership to pursue solutions is improved innovation. By establishing partnerships in R&D, a company expands its intellectual capital, brings new perspectives to the process, lowers costs, and, when the partner is located in a previously untapped overseas market, opens access to that market.

In choosing a “solution engineering” partner, companies should search for particular experiences and strengths (see Figure 3). Solution development and industry-specific experience are givens. Multidisciplinary expertise and existing in-house technologies to incorporate into their client’s designs, which bolster the partner’s ability to formulate truly creative solutions, are also valuable assets. But to maximize the benefits of collaboration, potential partners should also have global experience. After all, the greatest growth opportunities in the future will occur in markets outside of the United States, Europe, and Japan. Finally, partners should have experience in minimizing and managing risks.

Figure 3: Qualities to Seek in “Solutions Engineering” Partners

Industry-specific experience

Solution development experience

Existing in-house technology to support solution design

Global experience

Multidisciplinary expertise

Risk mitigation expertise

A COMPANY “ENGINEERING OUT OF THE BOX”

HCL Technologies Limited (HCL), a leading global engineering and IT services provider, is a perfect example of a company serving as a long-term innovation and “solutions engineering” partner to companies across industries. Headquartered in Noida, India, with operations in 31 countries, HCL leverages its significant product engineering knowledge and experience to offer fast and cost-effective services in:

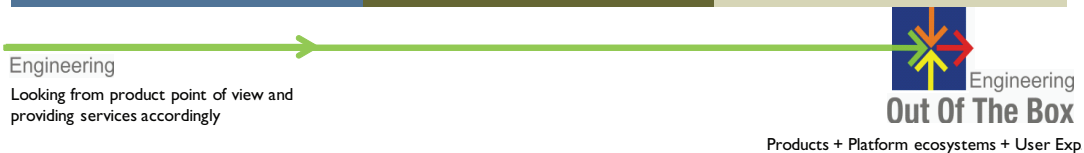
- Aerospace and Defense
- Automotive
- Consumer Electronics
- Independent Software
- Industrial Manufacturing
- Medical Devices
- Semiconductors
- Servers and Storage
- Networking & Telecom

HCL recognizes the importance of solutions models for expanding innovation and differentiating from competitors. According to HCL:

Products are no longer a sustainable competitive advantage for the OEMs [original equipment manufacturers], and we recommend a movement from a product-based business to a solution-based business. That is exactly the approach that we are creating, so that we can create a new avenue for that market channel.

The company has developed a novel approach to helping companies innovate called “Engineering Out of the Box” (EOOTB). The approach is based upon a philosophy that a company’s products are embedded in an ecosystem and that the user experience informs what happens within that ecosystem (see Figure 4). HCL offers capabilities and solutions in each sphere: the core product, its surrounding ecosystem, and user experience. This comprehensive approach is particularly important for companies invested in developing solutions for their clients. The breadth of services that EOOTB covers also allows HCL to become a full R&D partner, and not merely an outsourcing vendor for companies.

Figure 4: The EOOTB Approach



The EOOTB approach brings value to clients in three ways:

1. Core Products—HCL enables customers to develop cutting-edge, next-generation products by adding value in five areas: innovation, completeness, criticality, complexity and cost of ownership. The company provides full system development and product lifecycle development services based on its own industry domain expertise, which includes leveraging HCL's multi-disciplinary design and development skills.

For example, HCL is involved in developing 20 of the major mission-critical and most complex avionics systems of one of the largest aerospace companies in the world. In addition, HCL owns complete product management, design, development, testing, and support functions for the security software of a Fortune 500 software company. Managing support for the software is a significant undertaking, considering the client typically receives 40 million signature downloads within 30 minutes of a virus attack.

2. Ecosystem Innovation—Significant opportunity exists for companies to extend the reach of their core products into new markets by creating platforms for broader ecosystem innovation. HCL has invested in creating more than 20 productized solutions that can be used by the clients to extend their products across an ecosystem and help customers get their products to market earlier. HCL has in-house solutions that are leveraged by customers across multiple industries. These solutions are focused on a variety of areas, including: mobility, cloud, collaboration, online, convergence, smart devices, and green.

One of the biggest opportunities in ecosystem innovation is in moving existing products to the cloud. With the availability of multiple platforms and smart devices, customers are looking for a partner who will help them understand how they can leverage cloud computing to their benefit and how to convert their existing applications to a SaaS model. HCL has developed three productized solutions to cater to these needs:

- Cirrus—the Windows Azure enablement and management software,
- Nimbo—the HCL framework to jumpstart private/hybrid cloud service for customers, and
- Agora—to enable the quick conversion of existing applications to a SaaS model.

3. User Experience—New products must provide an improved user experience if they are to be adopted throughout a market ecosystem. The user experience is determined by the form factor, real-time and role-based experience. Consumer markets are well known for appreciating the importance of user experience on market adoption, but HCL's EOOTB brings a focus on user experience to other industries as well, including automotive, financial, medical, online, industrial and more.

HCL has created a smart home automation solution, Aegis, that is a multi-platform gateway that allows users to control multimedia, energy monitoring, HVAC, security and more using Android, iOS and Symbian devices. The solution can also operate on multiple wireless standards. In the development of Aegis, HCL paid special attention to making it intuitive and simple to use to ensure that users had a good experience, which would support market adoption.

HCL's unique EOOTB approach is significant because it:

- Expands a product's ecosystem by focusing on solutions,
- Minimizes a company's time to market, and
- Increases the product's adoption by focusing on user need and experience.

With the EOOTB approach, HCL is able to serve as a complete innovation partner to clients. HCL's team becomes an integral part of its partners' R&D function, developing and testing ideas at a pace far faster than a company can do on its own. And, putting into practice its emphasis on the need for companies to offer "solutions," HCL itself often structures partnerships with clients so that its compensation is tied to the outcomes it produces, not the number of people and hours devoted to an engagement. The following case study provides an example of the benefits of this type of partnership.

CASE STUDY: CISCO AND ITS CISCO® ACCESS REGISTRAR (CAR)

Cisco-HCL History: Cisco partnered with HCL in 1996 to establish its first Cisco Offshore Development Center in Chennai. Its original focus was software development for Cisco's Internetwork-Operating System (IOS). Over the past 15 years, HCL's partnership with Cisco has rapidly expanded to include more projects, greater responsibility, and innovative revenue-sharing models. In 2001, Cisco hired HCL to work on the Cisco® Access Registrar (CAR) under a traditional time and materials contract. By 2006, Cisco transferred the complete management and development of CAR to HCL, and in 2008, Cisco and HCL signed a unique revenue-sharing contract.

Cisco® Access Registrar: CAR is the flagship Cisco RADIUS and Diameter Authentication, Authorization, and Accounting (AAA) server for the service provider market. It supports service provider deployment of access services by centralizing AAA information and simplifying provisioning and management. CAR is a standard-based RADIUS/Diameter and proxy RADIUS/Diameter server designed for high performance, extensibility, and integration with external data stores and systems. CAR is currently deployed at more than 200 leading service providers worldwide to enhance network security and provide various service continuity for their wide-area broadband (WiMax), wide-area mobile Code Division Multiple Access (CDMA), Global System for Mobile communication (GSM), General Packet Radio Service (GPRS), Universal Mobile Telecommunications Service (UMTS), VPN, Wi-Fi, dial-up, DSL services, and other wired and wireless local-area networks.

Reasons for Partnering with HCL: By 2006, CAR was deployed across a large customer base and service provider market, but was in a sustaining phase. Cisco wanted to refocus its resources away from CAR and onto other opportunities, but at the same time wanted to maintain the focus and support for CAR. HCL was already engaged with Cisco on CAR in a traditional T&M model. Cisco was pleased with HCL's engineering capabilities and felt it would be the right partner to take complete control of CAR given its existing experience and knowledge.

Edward Chopskie, Cisco's senior director of products management in the Service Provider Management Applications Business Unit, describes HCL as an extension of Cisco:

"We have given HCL not only development responsibilities, but products management responsibilities and technical marketing engineering responsibilities. So we didn't just give HCL the source code and they have a bunch of people bang away on it and that's the end of it. They actually do product management of it, so they take customer requests; they meet with customers; they create technical and marketing documents for the product. It is, in fact, like HCL is an extension of Cisco; we have pretty much outsourced the entire program to them. HCL's product manager on the program reports to me, and he is like another employee."⁷

What is truly unique about Cisco's partnership with HCL is the revenue-sharing model they instituted in 2008. Cisco does not pay any upfront costs to HCL. Instead, HCL takes on the risk, receiving a percentage of every sale.

Benefits of Partnership for Cisco: Cisco has realized concrete benefits from partnering with HCL:

- Today, CAR is used by more than 200 service providers across the globe.
- Improved performance with more than 125 million transactions per hour.
- Improved quality with more than one year of no downtime across one of North America's largest service providers supporting smartphones and tablets.

And HCL has provided a complete solution for Cisco. Cisco has been able to maintain a product, CAR, with minimal financial risk, while refocusing its internal resources on new opportunities:

"We use HCL for a couple of programs like this and some that we would never be able to execute ourselves internally. So they have execution capabilities that Cisco would be challenged to do because we are just not staffed [to do so]. I cannot see a better business model than having shared risks. With this arrangement, they have got skin in the game. They can create and support a business model where there is very little risk to Cisco, and that makes it very attractive to us. They are great to work with; they are very easy; they make themselves available; they take full ownership of the program."⁸

⁷ Chopskie, Edward, senior director of products management, Cisco Service Provider Management Applications, personal interview, April 27, 2011.

⁸ *Ibid.*

The Importance of EOOTB in the Cisco Story: HCL's EOOTB approach was critical to the complete product management of the Cisco product. Unlike a conventional approach where HCL was simply providing engineering support services, the company was actually running a business for Cisco under a revenue-sharing model. This model required that HCL have a complete understanding of the product engineering aspects of the project, the supporting ecosystem around it and end-user dynamics. HCL's EOOTB strategy helped the company run Cisco's CAR like a product business with an emphasis on all three layers of the EOOTB model. HCL also found that it was able to leverage the product management experience it had accumulated in the course of developing its own in-house solutions to the benefit of the CAR program.

CONCLUSION

Companies can no longer rely on product or technological innovation alone to remain competitive. One very attractive means of differentiation is in offering solutions to customers. By combining products, communications technology and software together into solutions that gather, analyze and manage data, companies are able to offer greater value to their customers. Innovating solutions can be difficult for companies with no such infrastructure or experience. Consequently, partnerships with experienced service providers and technology companies are an ideal approach to help companies wishing to develop solutions. And partnerships offer the collaboration that is important to creative innovation:

The management of innovation is changing. No longer is the creation and pursuit of new ideas the bastion of large, central R&D departments within vertically integrated organizations. Instead, innovations are increasingly brought to the market by networks of firms, selected according to their comparative advantages and operating in a coordinated manner. In this new model, organizations deconstruct the innovation value chain and source pieces from partners that possess lower costs, better skills and/or access to knowledge that can provide a source of differentiation. The aim is to establish mutually beneficial relationships through which new products and services are developed. In short, firms increasingly seek superior performance in innovation through collaboration.⁹

HCL

HCL is a \$5.9 billion leading global technology and IT enterprise comprising two companies listed in India—HCL Technologies and HCL Infosystems. Founded in 1976, HCL is one of India's original IT garage start-ups. A pioneer of modern computing, HCL is a global transformational enterprise today. Its range of offerings includes product engineering, custom & package applications, BPO, IT infrastructure services, IT hardware, systems integration, and distribution of information and communications technology products across

⁹ MacCormack, A. "Innovation through Global Collaboration: A New Source of Competitive Advantage," HBS Working Paper 07-079. Boston: Harvard Business School, 2007.

a wide range of focused industry verticals. The HCL team consists of more than 79,000 professionals of diverse nationalities, who operate from 31 countries, including more than 500 points of presence in India. HCL has partnerships with several leading Global 1000 firms, including leading IT and technology firms. For more information, please visit www.hcl.com.

HCL Engineering Services Business

34 years of complex engineering experience

\$650 million business

200+ global customers across all industries

CISCO

At Cisco (NASDAQ: CSCO) customers come first, and an integral part of Cisco's DNA is creating long-lasting customer partnerships and working with them to identify their needs and provide solutions that support their success. The concept of solutions being driven to address specific customer challenges has been with Cisco since its inception. Husband and wife Len Bosack and Sandy Lerner, both working for Stanford University, wanted to e-mail each other from their respective offices located in different buildings but were unable to due to technological shortcomings. A technology had to be invented to deal with disparate local area protocols; as a result of solving their challenge, the multi-protocol router was born. Since then, Cisco has shaped the future of the Internet by creating unprecedented value and opportunity for its customers, employees, investors and ecosystem partners and has become the worldwide leader in networking, transforming how people connect, communicate and collaborate.

As market transitions evolve, so do Cisco's product offerings, all to best meet customer needs. Over time, Cisco has evolved from enterprise and service provider solutions to addressing customer needs in many other segments, including small, consumer and commercial. The network has truly become the platform for providing one seamless, transparent customer experience. As a result, Cisco and Cisco technology are changing the way people work, live, play and learn. Cisco strives to be the "Best in the World" and "Best for the World," offering solutions that meet customer needs, exceed their expectations and contribute to the world in a positive way.

CONTACT US

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Beijing
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Bogotá
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Dubai
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Seoul
Shanghai
Silicon Valley
Singapore
Sophia Antipolis
Sydney
Taipei
Tel Aviv
Tokyo
Toronto
Warsaw

Silicon Valley

331 E. Evelyn Ave. Suite 100
Mountain View, CA 94041
Tel 650.475.4500
Fax 650.475.1570

San Antonio

7550 West Interstate 10, Suite 400,
San Antonio, Texas 78229-5616
Tel 210.348.1000
Fax 210.348.1003

London

4, Grosvenor Gardens,
London SW1W 0DH, UK
Tel 44(0)20 7730 3438
Fax 44(0)20 7730 3343

877.GoFrost

myfrost@frost.com
<http://www.frost.com>

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Frost & Sullivan
331 E. Evelyn Ave. Suite 100
Mountain View, CA 94041