Providing insight and analysis for business professionals

3D printing
Moving to the mainstream

In better health
Increasing welfare in Ecuador

Platform revolution
Making networked markets work for you

If you’re adapting to change, are you evolving?

The better the question.
The better the answer.
The better the world works.
We read every day about the global pace of change being driven, primarily, by digitization. The smart organizations are those that have already become the disruptors rather than the disrupted. A recent Innovation Realized retreat,¹ run by EY and attended by 120 chief innovation officers, disruptors and thought leaders, provided valuable perspectives on how to prepare for and seize the upside of disruption.

The spirit of innovation was a fundamental characteristic of the way the retreat was run. Participants were taken firmly outside of their comfort zones as they brainstormed in a net suspended 18 feet up in the air, hung out in pools filled with thousands of plastic balls, sat in circles in a cloud filled with dense fog and dug deep into the emotional nature of eating.

Adapting to change is about learning and being willing to try new ways of working. In this edition of Performance, we explore some of the ways both companies and countries are doing just this. For example, 3D printing may now be a familiar technology to some, but our article discusses how its uses are becoming more widespread as its potential is embraced by new sectors.

“Platform revolution: how to make networked markets work for you” explains how platforms are being built in fields as diverse as health care, education, energy and government to create new efficiencies through unlocking hidden resources and discovering new forms of value.

Providing a differentiated customer experience has been a core focus for companies in retail sectors for many years, but what about other sectors? Read “Embracing customer experience in the pharmaceutical industry” to find out more.

Adapting to change is not just about embracing digital technology. We have two articles that examine the approach taken by two very different countries to improve their future welfare and economy. “Powering Ghana’s economic future” provides insight into how the creation of a renewable fuel power plant is enabling the country to realize its sustainability, growth and social prosperity ambitions. In a separate article, we explain how a nonprofit organization in Ecuador adapted to allow it to continue to provide health and social care for a second century.

In other articles, we ask if outsourcing can create value beyond savings. We investigate the prevalence and potential ease of cyber attacks in higher education institutions. And we examine how India is conquering digital chaos.

I hope the articles in this edition of Performance provide valuable insight and information to help your business grow, innovate and protect.

Enjoy reading this issue!

Markus Heinen
Chief Patron, Performance

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Can outsourcing create value beyond savings?

The global outsourcing market is in turmoil. The industry has been perceived as operational and tactical, but is now being put on the CXO agenda. It is very clear that outsourcing, as we know it, is slowly disappearing. Companies all over the world are experiencing an unprecedented pace of change, and they need to transform now.
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During the last 10 years, the outsourcing industry has been reinventing itself. It is a market with fierce competition, relatively low supplier margins and huge differences in business maturity – even between neighboring countries. While outsourcing operating models have delivered greatly on the bottom line all over the world, they have been, and to some extent still are, considered a necessary cost and a completely operative task. However, companies at the forefront are now expecting their sourcing strategy to deliver on their strategic objectives, promoting the outsourcing operating model to an area for the CXO team to own.

In a volatile global marketplace, it is important that service delivery is flexible and can contribute with real value by adapting to the ever-changing needs of the business, i.e., scaling up and down, as well as closing and opening new sites effectively and efficiently. In order to support transformation and to be at the forefront of outsourcing of services, a focus on innovation is crucial.

A mechanism must, therefore, be in place to support and incentivize innovation, which needs to be a joint priority for the supplier and the buyer. Currently, there is a move away from traditional transactional contracts that are based around each party trying to maximize their advantage over the other. In contrast, contracts are being founded on more partnership-oriented models based on trust and win-win ideology that aims for strategic value for both parties. Moreover, the focus is shifting toward more strategic and company-wide benefits such as proactivity, flexibility, innovation and contribution to corporate transformation.

However, we have discovered that the outsourcing market is confronting some very obvious challenges:

► Suppliers are not the proactive and innovative integrators that many wish for.
► Many outsourcing deals suffer from unfit sourcing business models.
► Both parties experience opportunistic behavior in their relations.
► Deals do not drive strategic business transformation.

Many outsourcing deals and relationships in the current market neither satisfy the buyers nor the suppliers. At the negotiation table, it was very clear that the fight was about “what’s in it for me,” and the least scrupulous individual won the deals and the respect. In order to build long-lasting partnerships, buyers, suppliers and procurement will gradually have to revolutionize the way in which they organize the outsourced function with the company. In order to respond to these new requirements, companies and suppliers must rethink how they create value.
How to address these challenges?

When the corporate strategic agenda changes, the sourcing agenda must too. In addition, it should support the corporate transformation agenda, enabling efficient and effective changes where the sourcing is concerned. This is not a one-off, large-scale transformation effort, but rather a continuous challenge for the service supplier to respond to external and internal pressures. The service supplier is increasingly being recognized as an important part of the business, not only in terms of business continuity and smooth running, but also as a lever for competitive advantage and a way of building company culture.

What is EY’s view on the future of outsourcing?

We know that fundamental change is required to be successful in the market, overcome the challenges, be proactive and innovative, and enable constant transformation. Proactivity, flexibility and innovation are values that the marketplace requires from outsourcing operating models.

“The more strategic and complex the deals that need to be designed, the more relational the contracts must be. Only relational contracts can enable the collaboration needed to achieve mutual strategic outcomes,” says David Frydlinger, Partner, Lindahl Lawfirm.¹

Simply put, to prepare for business, one must understand which sourcing business model to use.

Getting the sourcing model strategy right

In our view, both transactional and outcome-based business models will continue to be used in future. However, we predict that a growing number of deals will be strategic partnerships by nature.

Vested creates business relationships with experts outside one’s own domain, with the aim of achieving ambitious objectives never accomplished before.

Can outsourcing create value beyond savings?

Figure 1. Sourcing business model matrix

<table>
<thead>
<tr>
<th>Economic model</th>
<th>Relationship or contract model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome based</strong></td>
<td>Transactional contract (market)</td>
</tr>
<tr>
<td>Economics tied to boundary spanning and business outcomes</td>
<td>▶ Mismatch</td>
</tr>
<tr>
<td></td>
<td>▶ Not a viable strategy</td>
</tr>
<tr>
<td><strong>Output based (performance based and managed services)</strong></td>
<td></td>
</tr>
<tr>
<td>Economics tied to supplier output</td>
<td>▶ Mismatch</td>
</tr>
<tr>
<td></td>
<td>▶ Not a viable strategy</td>
</tr>
<tr>
<td><strong>Transaction based</strong></td>
<td></td>
</tr>
<tr>
<td>Economics tied to activities that drive behavior, e.g., per unit or per hour</td>
<td>▶ Basic provider</td>
</tr>
<tr>
<td></td>
<td>▶ Approved provider</td>
</tr>
</tbody>
</table>

Figure 1 illustrates that the vast majority of supplier-buyer service outsourcing business models in the market involve an approved supplier, a simple transaction supplier or preferred suppliers. These research results might surprise the players in the market who believe that they have strategic partnerships.

In reality, most companies actually have a transactional business model and contract that they call a strategic partnership. Many adhere to a preferred supplier model combined with a transactional contract. Moreover, some companies have a performance-based business model where the suppliers are rewarded based on performance. More often than not, they are combined with a transactional contract, which we no longer consider to be a viable option.

The more value beyond savings you want to achieve, the more you will tend to move upward on the vertical axis. In addition, you need to move to the right in the matrix, i.e., choose a relational contract instead of a transactional contract.

In the global outsourcing market, we see large, complex deals covering a vast number of services in many countries where both the buyer and supplier stick to the same old (transactional) routine while expecting different results from a structure that does not enable different results. In order to orchestrate new types of sourcing deals, new RFX² models are needed.

True partnerships that enable a win-win situation do exist, but they are rare.

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2. RFX is a generic acronym that refers to the many different types of tender, such as Request for Proposal, Request for Offer and Request for Solution.
The default soliciting process in the outsourcing market is a Request for Information followed by a Request for Proposal. However, the Request for Solution and the Request for Partner processes are vehicles that take the market to the next level. These processes differ from the default practice in many ways. A Request for Solution is different from a Request for Proposal in that the buyer does not know the solution; rather, suppliers are asked to propose the most appropriate solution. A Request for Partner process uses a Request for Solution, but adds an element that stresses the importance of finding a supplier that will be a “good fit” and culturally compatible with their organization.

Standard Request for Proposal processes cannot be used when entering a true strategic partnership. Think about it: you are going to create a bigger opportunity together rather than fight over it. Many developed service provider organizations are now getting ready for true strategic partnerships. In order to shift to the next gear or implement a new business model, new soliciting processes are needed.

True partnerships that enable a win-win situation do exist, but they are rare. The obvious question is: how do these contracts work and how are they created?

**Vested: a model for designing the next-generation deals**

A research group at the University of Tennessee, led by Kate Vitasek, founder of Vested Outsourcing, managed to codify the key elements of successful partnerships based on extensive field study research. The codified solution, called Vested, is, according to the university, “Business model, methodology, mindset and movement for creating highly collaborative business relationships that enable true win-win relationships in which both parties are equally committed to each other’s success.”

EY and Lindahl Lawfirm have, in collaboration over the last three years, successfully taken Vested to the real estate and facilities management (REFM) market in Europe.

“The reason why companies do not ‘get’ innovation is because they don’t buy innovation. There are several fundamental flaws with how existing outsourcing relationships are structured today,” says Vitasek.

Vested is a combination of an outcome-based business model and a relational contract. It creates business relationships with experts outside one’s own domain, with the aim of achieving ambitious objectives never accomplished before. These relationships are characterized as Vested because they involve creating a relationship in which the parties have a committed and profound interest in each other’s success. To put it simply, the parties are most successful when both reap the benefits.

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Can outsourcing create value beyond savings?

By applying Vested, the misalignments described in the previous sections can be avoided. This can be illustrated by looking at the five rules Vested is built upon, introduced as a chronological process where buyers and suppliers collaborate and apply a “what’s in it for we?” (WIIFWe) approach — not a “what’s in it for me?” (WIIFMe) approach.

Vested thinking is different. It often means going against how suppliers and business partners traditionally approach working together. It requires long-term, not short-term, thinking. Vested is about working alongside suppliers as business partners, rather than relying on default procurement processes that use transactional buy-sell principles.

Moreover, it is about moving away from rigid contracts and statements of work, instead creating flexible business agreements based on trust, transparency and fairness when business happens.

In our view, Vested is not just for big companies — it can be applied successfully in many types of contexts, whether private or public.

Figure 2. Vested five rules

1. Outcome-based versus transaction-based model
2. Focuses on the “what?” not the “how?”
3. Clearly defined and measurable desired outcomes
4. Pricing model with incentives that optimize the business
5. Insight versus oversight governance structure

Source: Vested™
We acknowledge that the “classic” way of carrying out service outsourcing business will remain, but not as the default choice.

The most obvious trend is the move from buying and supplying services’ activities as a “commodity” to buying competitive advantage through true strategic partnerships. EY has, over the last two years, become convinced that one of the business models to use to enter into these true strategic partnerships is Vested.

Your future role as an actor in the outsourcing markets

From a buyer perspective, we found that the sourcing business model needs to contribute to corporate strategy with value beyond savings. It must enable execution of the full corporate transformation agenda. Through combined forces, sustainable business transformation can be achieved faster when a small, yet competent, demand organization collaborates with a “best fit” partner. With that in mind, businesses must also change their way of structuring and soliciting their deals.

From a supplier perspective, we found that suppliers are shifting value creation chains in response to a very challenging business climate where a wider service portfolio (total cost of ownership) will enable suppliers to come closer to their clients. In the process, new value pools arise. Suppliers therefore welcome the movement toward true strategic partnerships, as strategic and complex deals are best orchestrated by using outcome-based business models in collaborative contracts. In the future, suppliers have a real opportunity to become true integrators that deliver real strategic client value that is closely aligned with the buyers’ strategic objectives.

From a procurement perspective, sourcing, as we know it, is slowly disappearing. Strategic relationship management is becoming a hot topic as new business models entering the market create completely new expectations for procurement. For this reason, procurement organizations need to become strategic business partners that focus more on value creation and less on savings. To achieve this, new competencies are needed, as well as knowledge about the market and which approach to use when requesting information, quotations and proposals.

And from our perspective, as advisors, we can see definite change as we move away from being perceived as “taking sides.” Our role will be that of a deal architect helping complex strategic businesses by facilitating the process and supporting stakeholders in generating desired results.

We believe that strategic partnerships and new business models represent the next level for the outsourcing service business. Lastly, we acknowledge that the “classic” way of carrying out service outsourcing business will remain, but not as the default choice.

It is not up to them, nor is it up to you, but it is up to all of us to help adapt to the new ways of working. That is a first step toward a better working world.
In better health: increasing welfare in Ecuador for a second century

Junta de Beneficencia de Guayaquil (JBG) is a nonprofit organization that has been providing health and social care in the city of Guayaquil, Ecuador, for over a century. In 2014, JBG chose an EY Advisory team to develop a program to help the organization deal with increasing demand. In this article, we explore helping JBG to grow sustainably, work efficiently and provide better care to more people.
Junta de Beneficencia de Guayaquil (JBG) is one of Ecuador’s most prominent nonprofit organizations. Its primary purpose is to improve, through its charity work, the quality of life for underprivileged people in the large city of Guayaquil, in the west of Ecuador.

JBG was founded in 1888 by a group of Guayaquil philanthropists who wanted to provide health and welfare services to the poor of the city. Today, JBG runs 18 separate institutions in a city of 3.5 million people, including 4 educational centers, 4 specialty hospitals, 2 elderly care centers and 2 cemeteries. It manages these services via its four divisions: health care, education, elderly care and funeral services.

In demand

In recent years, JBG has seen a substantial rise in demand for its services, particularly in health care. As a result of this, JBG’s operations have become increasingly complex. Its four divisions have had to operate more independently, and this revealed several operational problems.

In 2014, to tackle these challenges and to cope with the rapid growth that was required, JBG initiated an extensive transformation program to update its governance structures, operational models and technology architecture. It also opened a tender for advisory firms to bid to assist with the transformation, which EY was fortunate enough to win. Since then, we’ve worked closely with JBG on their ambitious program, particularly on achieving operational excellence and encouraging the four different divisions to share leading practices and innovation.

The transformation program will help enable JBG to respond effectively to market changes, increase its charity services coverage, improve process efficiency and reduce operational costs. It should also help the organization achieve its aim of being self-sustainable in the future.

Providing welfare for another century

Foundations for success

The foundations of the program set out JBG’s overall objectives. The transformation has a well-defined purpose: to achieve self-sustainability so that the organization can continue to provide its services into the future. The transformation program rests on six foundations (see Figure 1):

1. Purpose
2. Governance models
3. Operating models
4. Organizational structure
5. Processes
6. Technology

The governance model will focus on promoting a transparent and accountable culture. And the new operating model will apply across all of JBG’s divisions, with the aim of encouraging overall efficiency.

JBG’s structure will also be changed. Again, the focus is on clarity and efficiency via streamlined and clearly defined responsibilities throughout the organization. Finally, the transformation aims to encourage innovation in processes and technology.
Figure 1. Transformation program foundations

<table>
<thead>
<tr>
<th>Identity</th>
<th>Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>JBG’s purpose</strong></td>
<td><strong>Governance model</strong></td>
</tr>
<tr>
<td>Be self-sustainable to assure welfare and charity work</td>
<td>Promote a transparent and accountable culture</td>
</tr>
</tbody>
</table>

| | **Operating model** |
| | Promote a single operating model in all entities, contributing to synergies and operational efficiencies |

| | **Organizational structure** |
| | Promote a streamlined organization through cost improvements and defined responsibilities |

| | **Processes** |
| | Promote efficient and innovative processes across the entity |

| | **Technology** |
| | Leverage the operation by using innovative technological components |

**Objective**: Innovate, Grow, Optimize.
Planning the transformation

The transformation program started with a design phase. This focused on standardizing and improving policies, procedures and key performance indicators for governance, finance, health care and IT operating models. This phase presented some challenges. Processing a very high volume of information from JBG’s various divisions was difficult, as was achieving consensus on conflicting opinions from different stakeholders.

The second part was a readiness phase, conducted to ensure that JBG was properly prepared for the transformation. This included a review of the organizational structure, including reviewing roles and responsibilities, standardizing functions and positions, avoiding task duplication and implementing new business model requirements.

The readiness phase also reviewed cost centers, considering each operational unit and identifying corporate policies for cost allocation, as well as defining planning schemes and cost reporting.

At this juncture, we set up a change management officer to help improve the success of implementation procedures, facilitate the follow-up and coordinate the transformation program.

The final phases, which are currently underway, involve the implementation of technological software, including enterprise resource planning (ERP) and hospital information systems (HISs). This will help enable JBG to operate more efficiently and become self-sustainable. The final phases will be complete by the end of 2017 (see Figure 2).

“The transformation program will make our organization’s processes more efficient through the use of advanced technology. This will allow us to respond to the increasing complexity of our services and continued demand for innovation.”

Ernesto Noboa Bejarano
JBG Chairman
Executing the transformation

JBG’s transformation program has three components.

1. Governance model

JBG wanted its new governance model to focus on separating supervisory and management functions. The new model enables a standardized supervision framework, which allows the board to spend more time taking responsibility for the independent supervision of the four divisions. This includes looking at operational efficiency and transparency, the overall quality of services, social impact expandability and control of operational risks.

The governance model is underpinned by the principles of communication, transparency, and evaluation and accountability. In particular, it is designed to help monitor issues such as social impact, risk management and cost optimization.

This supervision scheme provides guidelines for the supervision and control of JBG divisions, while also ensuring operational transparency, attaining sustainability, improving social impact and controlling risks. The scheme will also encourage JBG’s leaders to ensure that managers act with integrity and are more accountable for operations and achieving targets.

This governance framework will enable permanent communication channels and formal reporting sessions – via supervision committees for each division – to control JBG’s performance.

2. Operational efficiency

In order to optimize its operational efficiency throughout the transformation program, JBG channeled its efforts into three chief segments. The design of these operating models was concluded successfully with the involvement of JBG’s board and employees. This takes JBG a step closer to achieving self-sustainability:

- **Financial operating model (FOM)**
  An FOM was designed for all JBG operating units, based on best practices seen at shared services centers. The new model allows JBG’s four divisions to focus on their core business, outsourcing corporate services, financial control and contract management to shared services centers.

  End-to-end processes looked at included: order to cash, procure to pay and record to report. Additionally, the new FOM includes operating processes such as: inventory management, cost management, fixed assets management, budgeting and forecasting management, and cash management.

- **Health care operating model (HOM)**
  A HOM was designed to focus on achieving high levels of optimization and process performance evaluation at JBG’s four hospitals. In turn, this will help improve services and secure the quality of patient care.

Asilo Bien Público Elderly Care
(Image used with the permission of Junta de Beneficencia de Guayaquil)
In better health: increasing welfare in Ecuador for a second century

Based on health care best practices, and considering the different specialties of JBG’s four hospitals, the scope of services considered a standardized operation for all hospitals in terms of patient admission, surgical scheduling, exams scheduling, beds distribution, inventory management medical audits, patient transfer and clinical documentation management.

“The key for JBG’s sustainability is to implement our new standardized best practices successfully among all of our divisions.”

Carlos Andrade Gonzalez
JBG’s Board Member Sponsor
The new ITOM was designed to improve IT operational processes. It involved outsourcing service desk and infrastructure operations, enhancing information security practices and standardizing JBG’s communication network. The initiative led JBG to integrate and simplify its IT operating model, as well as improve its technical, application and data architecture.

The implementation of the latest technology will help enable JBG to reduce operational time and improve internal efficiency and customer service. This re-engineering should help to reduce operating costs. It will also improve IT service levels, enabling reliable, available and integrated information – and encouraging IT to become a strategic partner for business strategy.

3. Technology enablement
JBG chose the latest generation of SAP HANA as the best system for fulfilling its new technical and functional process requirements.

Establishing a program and change management office has been a core part of this complex initiative. The change management office employs a highly experienced group of experts in managing large organizational transformations. The office’s main focus is on facilitating solid control, coordination and follow-up, and easing the transition’s impact on JBG as a whole.

The change management office will help the organization to embrace the transition as a positive growth opportunity. It will also improve communication regarding project status and the achievement of milestones. Key stakeholders are also involved in the process as organizational spokespeople and members of the implementation team. This helps them to acquire valuable knowledge, enhancing their professional skills and giving them the ability to train employees in the rest of the organization.

“The effectiveness of the new operational model relies on technology innovation. With the implementation of a suitable tool and the support of the proper advisor during this process, it would be possible to deliver expected results to the organization.”

Hector Freile Neumane
JBG’s Transformation Director

Working on a successful implementation
“The critical success factor has been the active involvement of JBG’s chairman and transformation steering committee,” says Diego Leon, the EY Partner leading the JBG project. “The committee led with purpose, having supported management to ensure work was implemented synchronously across the whole organization to achieve the stated objectives.”
EY and JBG called this the FOCUS approach, which stands for: “follow one course until success” (see Figure 3). FOCUS has been crucial to the success of the changes and agreements made so far. As a large organization with four separate divisions, JBG’s transformation process is inevitably complex. But the FOCUS approach helps to keep the end goal in mind and simplify the process. As you can see in Figure 3, at all stages of the implementation process – from gaining initial board support through to evaluating the results – FOCUS highlights how regular performance standards can be exceeded. It explains the improvements and optimizations that an organization will attain from different components of success: technological innovation, cost control, social return, adoption rates, performance evaluations, strategic relationships with partners and skills development.

**Becoming a global model**

The transformation changes that JBG has implemented in conjunction with EY will help the organization to continue to improve its provision of health and social care to the people of Guayaquil. JBG believes these changes will position the organization to achieve its vision of becoming a leader and a role model, not only for Ecuador or the Americas, but for the whole world.
Invest in innovation and leading practices, based on value generation.

Provide leadership and address strategic decisions.

Coordinate and orientate toward success.

Results for JBG:
- (+) Control
- (-) Costs
- (+) Revenue

Cost control:
- (+) (+) (-)

Performance evaluation:
- (-) (+) (+)

Competencies development:
- (+) (-)

Organized implementation:
- (+) (-)

Integrated workstreams:
- (+) (-)

Board members’ support:
- (+)

Technological innovation:
- Invest in innovation and leading practices, based on value generation.

Goal oriented:
- Prioritize initiatives based on results.

Relationship with strategic partners:
- Align industry leaders in support of JBG.

Use methodologies and standards for transformation project management.

Train, coach and measure learning effectiveness.

Facilitate close support and change management for operating lines.

Deliver broader quality services to society.

Expected status:
- Regular status

Successful implementation:
- FOCUS on implementation

High adoption rate

Social return

Relationship with strategic partners

Goal oriented

Control Costs

Revenue

Competencies development

Performance evaluation

Cost control

Results for JBG

Organized implementation

Board members’ support

Integrated workstreams

Technological innovation

Goal oriented

Relationship with strategic partners
3D printing: moving into the mainstream

As a transformative technology, 3D printing has had a long gestation, but its perception as one of the most significant inventions ever is about to become much more widespread. With fast-evolving techniques, applications and printed materials, including metals, 3D printing is becoming a critical tool from prototyping to final production across industries.
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3D printing is not in itself a new technology, but a new EY survey\(^1\) of 900 global companies shows it’s evolving faster than ever and being adopted by an increasing number of major companies – 36% are already applying or intend to apply 3D printing. In a still emerging industry landscape, aerospace, defense and automotive are the most mature industries to apply 3D printing, but it has vast potential for prototyping and manufacturing finished products in other industries, including resources, retail and even food.

**Why 3D printing needs to be on the strategic agenda today**

3D printing is, without doubt, a disruptive technology, but one that can be harnessed actively rather than reacted to hastily. The forthcoming report *If 3D printing has changed the industries of tomorrow, how can your organization get ready today?* explains how business leaders have now become more open to exploring how 3D printing can be embedded into existing manufacturing processes, or used to create entirely new ones. Combined with the arrival of 3D printing design and engineering specialists, there are many more opportunities for organizations to create complex designs that outstrip the limitations of traditional manufacturing.

For businesses, simply buying a printer is not going to unlock the full potential of 3D printing; instead, they need to consider the reasons for adopting 3D printing and how best to integrate it.

There is also a wider set of materials and material providers than in the past, giving companies more options for production. Many manufacturers are collaborating with material suppliers to create their own bespoke materials to solve specific problems, with an increase in quality and throughput. Printers, too, increasingly feature quality assurance tools to validate the printed product’s tolerances, layer by layer.

For these reasons alone, 3D printing should be high on the strategic agenda — and there are still more potential benefits that can be realized, including:
 ► Product development – reduced time to market and shortened product development design cycles
 ► Manufacturing – reduced process time via improved tools, less waste, fewer production or assembly steps and reduced lead time via functional integration of parts
 ► Engineering and maintenance – more flexible maintenance processes, lower maintenance costs and cost-efficient industrial engineering
 ► Logistics and warehousing – reduced inventory and reduced logistics handling, transportation and related costs
 ► After market – increased flexibility in delivery of spare parts, reduced costs of spare parts production and after-market care

Business trends driving the wider uptake of 3D printing

For businesses, simply buying a printer is not going to unlock the full potential of 3D printing; instead, they need to consider the reasons for adopting 3D printing and how best to integrate it. There are some key trends influencing these considerations:

► Individualization – customer co-creation. Consumers are increasingly looking for products that are tailored to their needs. The 3D printing industry has responded by printing parts as close to the time of assembly as possible, which allows for a reduction in inventory.² Dell has operated in this way for years, waiting for orders to come in before assembling bespoke units.

► Democratization – innovation and development from the masses. 3D printing makes it possible for individuals or collaborative teams to manufacture end products with fewer barriers to innovation. For intra-company collaboration, design teams can “fax” their part across the world to work with tangible products.

► Sustainability – the circular economy. There is a global movement toward sustainability among consumer corporations. 3D printing reduces transport costs when the printer is placed close to the manufacturing line or on remote operating bases where critical inventory requirements are high, and there are also operating cost efficiencies when airplanes are built with lighter materials.

Technology trends broadening the scope of 3D printing

The range of materials that can now be used is vast and expanding all the time, including plastics, porcelain, ceramics, stainless steel, carbon, graphene, titanium and other metals. This opens up the possibilities for making an increasing variety of parts in new ways.

► Moving beyond prototyping. 3D printing methods such as Direct Metal Laser Sintering (DMLS), Selective Metal Sintering (SLS) and Electron Beam Melting (EBM) have advanced 3D printing into industrial applications, including final assemblies. The EY survey demonstrated that 38% of the companies are expecting 3D printing to be part of their serial production in five years’ time. The question companies need to consider is: what network of supply chain assets, and what mix of old and new processes, will be optimal?

► Design lightweight objects. Honeycombing, another 3D printing method, creates especially lightweight products that are hollow or have an inner chamber that is connected in a similar structure to the interior of a bee hive. One material that is of interest for 3D printing is micro-lattice: made of a 3D open-cellular polymer structure of interconnected hollow tubes, it’s extremely strong and, being 99% air, is the lightest metal ever made.

► Using fewer components for complex geometries. With 3D printing, more components can be integrated into a single object, which improves not only product functionality but quality as well – with the added benefit of greater supply chain and operations efficiencies as there are fewer production steps and less interim inventory. Entirely new products, that weren’t possible using traditional technologies, are now within reach too, such as objects with conformal cooling channels or bionic structures.

► From material management to material science. A team of researchers at Harvard University in the US has extended its micro-scale 3D printing technology to a fourth dimension: time (i.e., 4D printing). Inspired by nature, the 3D printed particles form different structures based on a reaction to environmental stimuli. This is an example of advancement in programmable materials assembly and is the ultimate agile supply chain in that the programmable material can morph into what is required.

How different sectors are exploring 3D printing

► Aerospace and defense. Companies of all sizes are using this technology to deliver faster, lighter (better weight-to-thrust ratio), less wasteful (more fuel-efficient) and more financially viable products. GE has stated that, from 2016, its new Leap aircraft engine will include 19 3D-printed fuel nozzles, designed to last five times longer than traditionally made components.

► Health care. The medical field is being greatly impacted by 3D printing. For example, the entire US hearing aid industry converted entirely to 3D printing in less than 500 days, turning a manual, labor-intensive industry into an automated one. The technology helps organizations of all kinds reduce costs while providing high-quality, patient-specific care, for example, with prosthetics, dentistry and even bio-printing, where scientists can print human-sized bones, cartilage and muscle.

► Food. While there may be some questions about the idea of 3D-printed food, there has nonetheless been lots of innovation, ranging from crystalized sugar cake toppers and intricate chocolate designs to cracker-like yeast structures containing seeds that sprout over time. Early adopters include German retirement homes, which serve a 3D-printed food product called Smoothfoods to elderly residents who have difficulty chewing — the EU has invested nearly €3m in this project, with the hope of improving quality of life.

► Resources (i.e., oil and gas, and metals and mining). For suppliers, there is the potential to reduce the

cost of aftercare services for major equipment as there is less need to store or produce spare parts, especially for discontinued or older products. For operators, critical spares and wider inventory storage and transport costs can be minimized, and the lead time for the shipping of spares can be reduced to the length of time it takes to print parts. It also allows lower-cost trials and prototyping of new components in existing plants and operations. Sandvik, a major supplier for many resources companies, is evaluating 3D printing through various initiatives to observe how the technology can be used in its production — advantages may include faster production, increased flexibility and being able to create components in unique shapes.8

**Automotive.** With 3D printing, lightweight car components can be produced, reducing weight, and improving performance and fuel economy. Direct manufacturing applications, where 3D printing can be used for low-volume and high-customization parts, can also create significant efficiency gains in production, operations and supply chain. For example, BMW engineering developed a one-piece, light-metal 3D-printed water pump wheel that incorporates design refinements and prints the component in small batches to replace a plastic part.9 Taking the concept further, Local Motors has created a car using 75% 3D-printed components — traditionally, it takes thousands of components to make a car.


The range of materials that can now be used is vast and expanding all the time.
Certain areas of the 3D printing industry are currently highly fragmented. This presents an opportunity for a major player to offer a standardized platform.

Car, whereas Local Motors has created one with just a few dozen, reducing complexity and increasing longevity.10

► Consumer products and retail. Rapid manufacturing using 3D printing enables mass customization, reduced time to market, and numerous efficiencies in manufacturing processes and along the supply chain. To explore new potential applications, Nike has established a design and manufacturing center in partnership with DreamWorks Animation that is capable of “nearly instantaneous digital print applications, photo-real 3D visualizations and ultra-rapid prototyping.”11

Further opportunities and considerations in the near future

There are many opportunities still to be discovered by exploring industrial applications. Data is a particularly rich area, for example: when 3D printing is used to manufacture parts, that portion of the process becomes “natively digital,”12 managed by software, with a continuous outward stream of data created and available for analysis. Likewise, there is the potential to use tracking and analytics to plot the consumption of spare parts and enhance product performance, as well as predict maintenance and aftercare activities.

Certain areas of the 3D-printing industry are currently highly fragmented. This presents an opportunity for a major player to offer a standardized platform for approved, crowdsourced printing files, guaranteeing security, data privacy and stability. This fragmentation presents other challenges too: for example, understanding the tax implications of a blueprint created in one country that’s then used to 3D print a

product in another. And it can be very
difficult for organizations to source vendors
that meet diverse requirements in processes
and materials. There is also still work to be
done to make the case for 3D printing in
certain areas. For example, environmental
analyses should factor in the power and heat
required for 3D printing, as well as material
that can or cannot be recycled, especially
when comparing 3D printing with traditional
prototyping and the engineering steps that
may normally be required.

Intellectual property (IP) sets the
stage for any discussion around 3D
printing and taxation. How and where 3D
IP is owned and authorized for use will be
critical to business relationships and the
characterization of income from them.
While the OECD is rewriting tax models
for electronic services and other digital
intangibles, which is clearly also touching
on 3D printing – as IP and cloud-based
digital blueprints are shipped across borders
to printers – there is little clarity about
how effectively these taxes would shift to
“digital tangibles.”

It’s in areas such as this that EY’s
experience and connections are invaluable.
Bringing together different competencies
including strategy, supply chain, design
and engineering, product development,
analytics and IT, as well as tax and legal, can
help manage the end-to-end process of 3D
printing and accompany organizations on
their journey to adoption. In an inventory
of thousands, choosing which components
may be best suited to 3D-printing requires
a diagnosis and methodology too. EY
can recommend and bring together the
right vendors for a 3D-printing route and
even help explore new services to run
pilot 3D-printing factories as a managed
service in parallel with normal operations,
finetuning processes before they go live.
We can also facilitate the cross-pollination
of techniques developed in other industries,
thereby enhancing manufacturing in
new ways.

What’s next?
The case for 3D printing will vary between
organizations and sectors: it may be
rooted in issues such as pricing pressure,
increasing customer requirements or the
operational challenges of responding to
customer needs quickly enough. Overall,
though, 3D printing can help companies to:
► Gain competitive advantage
► Improve their position in the value chain
► Achieve growth
► Increase the efficiency of their supply
chain and operations
The key first steps toward these goals are
to raise awareness within the organization
of what 3D printing is capable of, then
identify the areas of application and
use cases that will bring the highest
added value. After this, it’s essential to
develop a transformational road map
to build capabilities and redesign the
organization in a way that will enable
the sustainable implementation of the
3D-printing technology into the company.

It’s clear that simply buying a printer
is not enough to harness the full potential
of 3D printing. Nor is this a journey that
can be completed successfully without
experienced insight and collaboration:
just as with any technology-based
transformation, success depends on
understanding where an organization
can yield value. And that relies on asking
the right questions.

While there may
be some questions
about the idea of
3D-printed food, there
has nonetheless been
lots of innovation.

EY’s forthcoming report If 3D printing has
changed the industries of tomorrow, how can your
organization get ready today? will be available at
It is the companies that focus on continuously delivering better customer experience to build a trusted and transparent relationship over time that will win in the market. They will not only acquire customers that will remain loyal, but also win advocates that will refer the company or brand to more customers. In this article, we explore what customer experience means for the pharmaceutical industry.
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Customer experience has certainly become the buzzword over the last few years in marketing and technology forums, and is very often used in association with a broad variety of topics, ranging from ethnographic research and user experience through to marketing and sales automation. The concept of customer experience is indeed broad. When we talk about customer experience in this article, we refer to the interaction a customer has with a company over the duration of their relationship. Conceptually, improving the experience provided to the customer implies simple steps, such as the analysis of the customer’s rational, physical and emotional perception of this interaction, and leveraging those insights for the design and delivery of a better differentiating experience. It’s about always being able to offer the customer the next best action (NBA) or the next best offer (NBO) for every situation, channel and interaction point.

Customer experience: beyond the hype

Focusing on providing better customer experience is certainly nothing new for many industries. Retail, consumer products, telecommunications, automotive and fast-moving consumer goods companies have been focusing on the provision of this differentiating experience for decades and become increasingly obsessed with being consumer driven. However, as our society and technology evolves, the way customers behave and consume is changing dramatically, making the management of customer experience more complex than it used to be. Customers are now immersed in a world full of information and options, continuously experiencing and comparing how organizations perform in their interaction with them, and sharing these experiences within their networks and the broader community. Reviewing these shared experiences on social media has become a natural step...
in the decision-making process of most customers, making them now more empowered than they have ever been.

In this changing context, having a better product is no longer enough to keep ahead of the competition, especially in the retail industry, where the seamless orchestration between the different channels (cross-channeling) has become key. Saying this, providing better in-store customer experience has become the “right to play,” while optimizing the experience in online interactions before and after the in-shop experience has become critical for business success.

Emerging companies have transformed entire industry business models through a razor-sharp focus on the resolution of the “bad” experiences in legacy industries. Uber is an example of a company that, beyond putting the supply side of the business model on its head, is winning in the mobility market by turning common pain points and the potential frustration of finding and getting into a car, and paying for the ride, into a seamless, trustworthy and easy experience.

While these fresh approaches to business are often associated with new and more nimble companies, it is actually in the traditional markets where the biggest opportunities for using customer experience can be found. In those markets, staying differentiated and keeping customers loyal is becoming a huge challenge, making the focus on continuously delivering better customer experience even more critical to business success.

**Customer experience is the next battleground**

Pharmaceutical companies have understood the importance of reinventing the way they engage with their customers in this changing world, and the notion of “customer experience as the new battleground for the pharmaceutical industry” is making the rounds at conferences that are bringing together pharmaceutical marketers.

In the context of the commercial functions in the pharmaceutical industry, this battleground is a race to evolve the traditional “push” sales and marketing model (to physicians, payors and patients – in geographies where these practices are permitted) toward a “pull” model that allows the engagement of customers, with a focus on addressing their needs and expectations. An illustrative example of a need could be the convenience of accessing information that is relevant to a digitally savvy medical practitioner outside of working hours, on an easy to deal with digital support that offers an environment that is engaging and inspires transparency and trustworthiness.

This improved experience is provided by engaging the right customer with the right message and content, through the right channels and format at the right time. For companies born in this “empowered customer” era, such an engagement is part of the normal way of doing business. For companies with a longer heritage in more traditional sales and marketing models, such as pharmaceutical companies, adapting to this new environment represents a challenge.
Properly executed design of the customer experience enables organizations to understand their customers’ expectations and needs, and align their interactions accordingly.

Figure 1. Customer experience is the new battleground

- Target the right customers ...
- ... with the right message and content ...
- ... through the right channels ...
- ... in the right format ...
- ... at the right time ...
- ... in the right way (compliant).
Pharmaceutical companies face uphill challenges at both internal and external levels as they strive to engage in customer experience. At the external level, the most immediate challenge is the existence of different types of customers across markets with diverse, and sometimes even contradicting, needs and expectations. The value proposition, messaging and engagement strategies are, for example, very different depending on whether the customer is a payor, patient or physician, and often different again for each of these customers across different markets and geographies.

A further challenge is the increasing lack of trust from the general public in the pharmaceutical industry, which makes interactions with customers even more challenging over time.

However, internal company barriers are probably the most challenging to tackle. Culturally, focusing on customer experience requires a complete rethink of how pharmaceutical companies interact with their customers. The emphasis should be on understanding and addressing the needs and expectations that are not directly related to product attributes.

Organizationally, delivering on customer experience, and optimizing the offline and online touch points along the customer journey, requires a collaborative effort across multiple functions (e.g., medical affairs, sales, marketing and market access) that, as of today, tend to operate in silos. And finally, capability-wise, efficiently delivering on customer experience requires a level of digitalization (in terms of marketing automation, closed-loop marketing and analytics, etc.) that is often beyond the current level of digitalization of most pharmaceutical companies.

The deployment of customer experience is a transformational journey in often unchartered territories. The two keys to success are the ability to manage a process that is both rigorous and iterative in driving this transformation, and the willingness of the organization to move from a functional thinking approach (i.e., “inside-out”) to a customer-centric orientated approach (i.e., “outside-in”).

**Customer experience deployment**

At the heart of the process must be a clearly defined vision of what the organization aims to achieve or accomplish with this transformation in the mid or long term. Will it be about solving specific problems for certain brands in selected markets? Or about reinventing the way the company, as a whole, engages with customers? Alternatively, is it more about instilling a culture of customer centricity across the organization?

Proper governance will allow project accountabilities and responsibilities to be successfully set and driven (and monitored) alongside business-as-usual activities – which often take priority. Early engagement of in-country group companies, together with sponsorship at the management level, is critical for the project’s success and avoids it becoming a purely theoretical exercise at the head-office level.

In-country group companies will need to be engaged in hands-on deployment early in the process. There is a large gap
Figure 2. Customer experience design is an ongoing and iterative process that brings together four different dimensions.
Decisions, such as the scale and timing of deployment, or whether the focus should be across countries or brands, need to be taken early and driven by a business case that quantifies expected impact and return on investment.

Strategy and ambition
The context needs to be set for experience engineering by defining the priority segments and experiences, and the customer promise and ambition level (e.g., reimagine the experience or fix the basics).

Customer insights and experience design
The best experience design starts and ends with listening to and observing customers, and establishing the things they are trying to do, their frustrations, delights and key moments of truth.

Enabling capabilities
The experiences need to be enabled by a mixture of people, processes and technologies.

Experience implementation
The scale of change must be quantified, together with a road map and the associated costs and benefits.
In-country group companies will need to be engaged in hands-on deployment early in the process.
This prioritization of moments of truth will inform future customer engagement decisions, which may be as simple as stopping activities that are currently clearly annoying the customer. Repetitive and irrelevant emails are often an easy-to-spot culprit. In this way, these newly discovered customer preferences can inform which and how current interactions should be tweaked or adapted, and what new offerings should be developed to address the unmet needs now identified. These decisions will drive the intentional journey for customers.

A clear definition of the future or “to be” journey is essential to understand the capabilities needed—in terms of people, process and technologies—to successfully deploy the experience in a consistent manner. This includes assessing current capabilities, and identifying gaps and deploying initiatives to cover them. The implications in terms of people, process and technologies will depend on the intended experience, but the minimum prerequisites often include effective channel and content management, the ability to sequence the offline and online interactions with the customer, and the measurement of impact through adequate analytics.

Enablement of the group’s companies can be achieved by the provision of training and playbooks to equip the brand teams, and their counterparts in operations, with the appropriate tools and knowledge. A special area of focus for this knowledge transfer must be the understanding of the local legal and regulatory environment, and the implications for customer engagement activities.

Implementation is best supported by a robust road map that has been designed, vetted and agreed upon between the head office and subsidiaries. Decisions, such as the scale and timing of deployment, or whether the focus should be across countries or brands, need to be taken early and driven by a business case that quantifies expected impact and return on investment.

**Conclusion**

In our rapidly evolving society, it is becoming the norm for customers to make their decision on whether they buy a product based on their overall experience in dealing with a brand or company.

The pharmaceutical business environment is complex, science-driven and regulated. While purchasing (or prescribing) decisions in this environment are not solely driven by personal preference, the industry is not immune to this transformation. Its customers are becoming resistant to push sales and marketing, and are instead preferring to relate to the overall experience provided in their pull interactions with the company.

Customer experience will be the next battleground for the pharmaceutical industry. The deployment of a customer experience capability is a transformational journey in often uncharted territories. Key to success is to start early and drive a process that is both rigorous and iterative, allowing the organization—and its customers—to learn along the way and always to be ready with the next best action in place.
Powering Ghana’s economic future

Making power generation sustainable is becoming a major issue for countries globally. For developing countries, it’s compounded by the tension between driving growth and social prosperity, and doing it in an environmentally responsible way. Ghana is exploring a way to make both ambitions possible.
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Like many countries, Ghana is trying hard to meet its energy needs without relying wholly on fossil fuels. So increasing power production using local and renewable energy sources aims to improve energy security and grid stability, with the added benefit of boosting private sector involvement in the industry.

Ghana currently relies on two primary types of generation: hydroelectric and thermal plants. Due to high power demand and low supply capacities, hydropower mainly provides the base load, and output is dependent on the water level of the dams, which has been in decline in recent years. All of Ghana’s thermal power plants are located in the south of the country and, currently, most of the fuel is imported, leading to a dependency on sufficient supply, exposure to price fluctuation and currency risks. There can also be supply delays and production shortages due to technical issues.

In the industrial northern region of Ghana, there is no large power-generation plant at all, with the exception of the Bui dam, which has an installed capacity of 400MW. While this region’s rural areas are mainly supplied with decentralized systems, such as diesel generators, mainstream power largely needs to be transported from the south. This situation leads to losses in transmission and potential stability problems in the grid. Demand for power is currently much greater than the available generation supply, so expanding generation capacity is one of the top priorities for Ghana’s Government.

This is a big issue, because a lack of reliable power is a major constraint to economic growth. According to the Energy Commission of Ghana (EC), sales of power increased by an average of 7.2% a year from 2005 to 2013, driving up sales for the grid operator NEDCo by 9.2% in the same period. Yet, out of a total generation capacity of 2.2GW, only 1.4GW were utilized due to limited water elevation in the dams, technical problems and a shortage in the supply of conventional fuels.¹

The challenge of grid stability
To provide reliable power that meets rising demand, and to reduce dependence on hydroelectric power, Ghana’s Government intends to diversify the power sector with thermal fuel and renewable power projects. Currently, the percentage of renewable power generation (excluding hydropower) is very low – just 0.1% at the end of 2014² – but the country has set a target of 10% by 2020. To support this, the Renewable Energy Act 2011 (Act 832) has introduced 10-year feed-in tariffs for power production from solar PV, wind and biomass to create a renewable energy capacity of 500MW.

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¹. Volta River Authority (VRA), 2015 Tariff Proposal.
In 2015, the African Project of Sustainable Development (APSD) approached EY to investigate the potential benefits of a renewable fuel power plant in Ghana. Working together, the cross-functional, multinational team helped APSD to instigate a major biomass-powered energy project. Because the lack of electricity access is particularly acute in the northern region of Ghana (lower than 50% in some parts) the APSD chose this area to locate the facility. Based on a large-scale eucalyptus plantation in the Brong Ahafo Region, the source and plant will be fully integrated from an operational and legal perspective, and the large-scale plantation will also help reverse the rapid deforestation of Ghana, while capturing and permanently storing carbon dioxide.

A sustainable closed-loop energy model
Eventually, the facility will have a total area of 22,809ha, with 60% used as plantation, 25% reserved as environmental protection areas and the remaining area set aside for villages, infrastructure such as roads, and other protected areas, including burial grounds.

Plantation seedlings are grown in the nursery (which currently has space for 20 million seedlings, rising to 25 million eventually), planted and harvested five years later (see Figure 1). The plantation is on degraded or deforested land, meaning that no existing forest formations or crops have been replaced. The most fertile land will be reserved to grow food.

It’s widely accepted that a direct increase in employment will entail an indirect employment effect caused by a higher demand for food, short-term shelter, long-term housing and living space, and consumables in general.
in cooperation with the local population. As the plantation will be a monoculture with limited biodiversity, the design includes protection areas, for example, close to water resources. Biodiverse areas will be preserved and natural vegetation maintained or re-established.

The plantation should not need any watering, instead relying on readily available rain water – boreholes show that groundwater sits at depths of about 50 to 180 meters, whereas the average rooting depth of a fully grown eucalyptus tree at felling age is only around 3 meters, so does not drain groundwater. After five years, the trees will be felled, debranched and stacked to dry for four to six weeks without additional heat. After logging, the area will be replanted immediately. Logging and replanting will be done continuously to reduce seasonal work, and wood ashes will be continuously taken out and recycled in the plantation or in areas of food production as fertilizer. It represents the main residual and amounts to approximately 0.5% of the biomass fired.

Firing all this wood is a biomass power plant, located in the center of the plantation so it can easily be reached, lowering transport costs and enabling future expansion. The plant will only burn wood fuel produced in the plantation.

Construction is scheduled to begin in late 2016, and the plant will be operational in 2019. Power production is estimated to be 426GWh a year – 12% of the total renewable energy target.

**Powering economic development with employment**

Despite Ghana’s progress in poverty reduction and human development, a significant proportion of the population still lacks decent work opportunities – the north of the country and rural areas in general are a major concern. Women in rural areas, in particular, face greater difficulties
in transforming their labor into more productive employment with higher and more secure income. Similarly, the young rural population faces barriers in joining the labor market, and migration is often a livelihood strategy.\(^3\)

The northern, upper western and upper eastern regions of Ghana remain the most affected by extreme poverty, and there is a concerning shortage of employment opportunities for young people. While official statistics point to a low unemployment rate (2.5% of economically active males over the age of 15 – a rate that is seldom achieved by industrialized countries), there are a number of possible factors influencing why this might be:

- The definition used for labor and workforce
- The system for registering unemployment
- Gender inequalities that have not been taken into account
- The impact of agriculture being a low-wage sector

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Construction is scheduled to begin in late 2016, and the plant will be operational in 2019.
Figure 2. Estimate of factors influencing direct and indirect employment effects

APSD power plant project

Income  \rightarrow  Linkages  \rightarrow  Direct increase: employment 1,700 x 1.6 = 2,700 new jobs

Private households  \rightarrow  Private sector  \rightarrow  Government

Taxes

It’s widely accepted that a direct increase in employment will entail an indirect employment effect caused by a higher demand for food, short-term shelter, long-term housing and living space, and consumables in general. Aaron (1999)\(^4\) calculated a factor of 1.6 to describe the direct and indirect effect caused by an increase in employment. Combined with a low share of seasonal workers, this would further strengthen the development of the region.

The APSD estimates that the plant needs a labor force of 1,500 to 1,700 people and a staff of 30 for the power plant when it reaches its full scale (see Figure 2). In October 2015, the APSD employed a total of 1,024 people, and the remaining roles left to fill will largely be

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from within a lower-income group. However, all employees receive health insurance and pension scheme contributions, and high labor standards have been established. Based on the application of the multiplier effect “k” (see “Calculating the multiplier effect” for an explanation of k), it’s estimated that the power plant project will have the employment effect of creating 2,700 jobs (direct and indirect). This will increase disposable incomes and therefore drive greater private consumption. Applying a multiplier effect k of 3.0 on annual payments for salaries and wages, the added value amounts to US$3.4m in 2015 and US$5.7m in 2019.5

Conclusion
This project has generated a lot of enthusiasm, and it remains to be seen how positive an effect it will have on employment and wider social factors. Either way, the new plant will help to increase grid stability and power supply and, in addition, will promote the local economy in the Brong Ahafo Region of Ghana. It’s a strong example of how it’s possible to combine economic growth with sustainable development.

Calculating the multiplier effect
To quantify the positive side effects, a multiplier factor “k” was defined. This factor is a macroeconomic concept to measure the effect that a change of an exogenous variable has on an endogenous variable – so k is a proportionality ratio. In this context, the team used the change of consumption caused by an increase in disposable income (the “marginal propensity to consume” (MPC). Optimistic approximations state a multiplier effect of k equals 3.6 based on progressive assumptions founded on a MPC of 0.8. A more conservative approach finds a multiplier effect of k equals 2.6 based on a MPC of 0.61.6 A realistic approximation of the multiplier effect, which neither overvalues nor underestimates the impact, is assumed with a multiplier factor of k equals 3.0.
Cybersecurity in higher education: the changing threat landscape

The particular nature of higher education institutions means they are far more prone to cyber attacks. Elements such as open networks, large volumes of data and freedom of public access expose them to a variety of cyber threats and risks. These are challenges that will only grow as cyberspace continues to evolve. In order to secure these institutions, it is important for their decision-makers to understand the threats and associated motives and, by doing so, be better placed to implement proper controls that safeguard the institution’s most valuable information.
While cyber threats and risks are unique to each industry, higher education is currently one of the top five sectors facing high numbers of cyber attacks. For example, recent research has identified that, every hour, one-third of universities in the UK are hit by a cyber attack.¹

The environment in which higher education institutions operate, and the data that they store, is what makes them prime targets for a cyber attack. The campuses of higher education institutions are, often, like mini cities, due in part to the many students living on campus, but also because of local visitors and those providing services to support the various education programs on offer. A variety of data is generated and collected as a result of the support made available to the members of these institutional communities (i.e., students, faculty, staff and visitors), such as:

- Financial data relating to tuition fees and student loans, etc.
- Personally identifiable information (PII)
- Health and medical information
- Enterprise data
- Higher education operational data (e.g., grade management system and research data)

63% of reported breaches occur in doctoral institutions. (Educause Just in Time research)

35% of all security breaches take place in higher education. (Educause Just in Time research)

46% of higher education networks with breaches had verified advance persistent threat (APT) activity taking place in their environment. (FireEye)

The environment in which higher education institutions operate, and the data that they store, is what makes them prime targets for a cyber attack.

In recent years, the number of cyber attacks on higher education institutions has seen a significant rise.

This data is often stored in a variety of systems strewn across multiple departments within the institution. As a result of ever-increasing educational needs and competition in the sector, the volume and types of data collected continue to grow. And this growth carries even more risk to higher education institutions, as they become targets for identity theft or the stealing of financial information or IP. In recent years, the number of cyber attacks on higher education institutions has seen a significant rise.

Figure 1. Types of data breaches impacting higher education institutions

- Hacking and malware: 36%
- Unintended disclosure: 30%
- Portable device: 17%
- Stationary device: 7%
- Physical loss: 5%
- Insider: 1%
- Unknown: 3%
The College of Engineering was targeted by two sophisticated cyber attacks that compromised servers containing records relating to 18,000 people. The attacks had been undetected on the college’s network for some time.

At least one of the two attacks was carried out by threat actors in overseas territories.

The attack resulted in the network being unavailable for three days.

The networks of six Japanese universities came under simultaneous cyber attacks.

On the same day, one of Japan’s banks was also hit by DDoS attacks.

One university said 360 email addresses may have leaked, while another may have lost ID numbers relating to its website admin.

A cyber attack targeted the university’s network, compromising 287,580 records of students, faculty, staff and affiliated personnel.

The database breach affected everyone who had been issued a university ID between 1998 and February 2014.

A cyber attack on a computer system exposed the identities of more than 72,000 people.

Hackers exploited a vulnerability in web-based software used by the university and stole names, addresses, social security numbers and university IDs of current and past employees.

The official website of King Saud University (KSU) was hacked by an unknown hacker.

A database of 812 users was hacked, and the contents were dumped on a file-sharing site.

The data included mail addresses, mobile phone numbers and passwords.

Keyloggers, hardware devices that can capture personal data by tracking keystrokes, was found on some workstations in two of the university’s libraries.

The breach potentially impacted anyone who had used the affected computers in the past year.


Protecting the security of information and IT assets has always been challenging, mainly due to the unique environment and industry in which these organizations operate. Detailed here are some of the challenges that affect the ability of higher education institutions to plan and defend against cyber attacks:

► Decentralized IT and information security practices, which are the result of various faculties running their own IT and security departments, cause the enforcement of streamlined security practices to become very difficult.

► Freedom of information is woven into both the higher education sector and academic culture. One of the consequences of this is the prevalence of open networks, which may not be properly monitored for unauthorized access, unsafe internet surfing habits and malware infections.

► Insufficient resources, specifically information security funding challenges, are typical in many higher education organizations and prevent them from implementing the necessary controls to battle rising cyber risks.

► Campuses are the ultimate “bring-your-own-device” (BYOD) environments, and there is a plethora of unrestrained devices. This results in the campus IT staff having limited ability to control what machines are connected to the campus network and manage their security controls. The effect is a dramatic increase in the attack surface for the entire institution.

► Various faculties usually have computing devices used for projects or to store scientific data. In many cases, these devices may be procured by each faculty independently without following formal security architecture guidelines. Unstructured data, generated and processed by these computing machines, is very hard to locate, classify and safeguard.

► Insufficient physical security results in institutions being unable to determine the original attack vector for security incidents that have a physical element.

► The lack of threat intelligence collection and sharing between universities and colleges means that these institutions remain unaware of the emerging threats.

Why is the higher education industry targeted?
The motivation behind cyber attacks varies depending on the institution’s size and reputation. Large research-based universities are more likely to be targeted by organized criminals or foreign governments who want to gain access to valuable research data, while small to medium-sized higher education institutions are more likely to be the targets of organized criminals or students.

During the last few years, various threat actors have shown more interest in attacking the higher education sector, motivated by a variety of reasons:

► Hacktivists want to provoke media exposure from the security breach and negative attention for the institution.

► Cyber stalkers want to cause reputational damage.

► There could be an insider threat that aims to manipulate the grade system or assist in an organized cyber attack.

► The threat could be financially motivated, for example, using ransomware to restrict access to critical data followed by a demand for a pay off.

► The threat could come from a foreign government that wants to gain access to leading institutions’ research data (i.e., nuclear research).

► The threat could emanate from corporate espionage. These attacks are initiated illegally by corporations with the aim of gaining access to confidential research papers. The attackers’ motives are influenced by the type of data and the available gains, and can vary from institution to institution. For instance, those that store research data are more likely to be targeted by organized crime syndicates or state-sponsored attackers, whereas any personal data that is hosted might be targeted by cyber stalkers.

In some cases, attackers may use the higher education institutions as a means to attack other organizations or individuals. As higher education institutions may provide “back-door” access to their peers and partners, their vulnerabilities can be exploited by adversaries to gain unauthorized access to safeguarded material. Higher education institutions also provide infrastructure, such as high-speed networks, and massive computational capacities that can be used to launch attacks against others, such as Distributed Denial of Services (DDoS) attacks.

Institutions that store research data are more likely to be targeted by organized crime syndicates or state-sponsored attackers, whereas any personal data that is hosted might be targeted by cyber stalkers.
sending spam emails or the creation of Botnets\(^8\) for other malicious activities.

Lastly, the openness of these institutions’ networks makes them easy targets to attack and exploit. It means they are more vulnerable to ransomware, drive-by downloads, phishing and other cyber attacks.

Cyber attacks against higher education institutions can have an operational, reputational or financial impact, depending on the nature of the attack. For example, the following are some of the potential consequences of a security breach:

- Identity theft can result in reputational damage, and could subject the institution to regulatory fines and attention.
- Reputational attacks can have a significant negative impact on competitive advantage.
- Attacks can also result in a loss of confidence in the institution among current staff, faculty, students and prospective students.
- Financially motivated attacks, such as ransomware, can have a significant financial and operational impact on the higher education institution.

### How to secure your organization

The following recommendations outline some of the measures that can be taken to help protect and secure IT and information assets in higher education institutions:

1. Develop an overall information security program across the institution that clearly outlines security policies, standards and procedures for all security domains. Manage the program via a centralized information security authority and provide each faculty’s IT staff with some degree of autonomy.
2. Create a security architecture function that would oversee the requirements of various infrastructure changes, computing device procurement and large initiatives, and provide standards, guidelines and reusable component catalogues for smaller projects across the institution.
3. Create a cybersecurity awareness program to train students and staff continuously on potential risks and methods of mitigating them.
4. Use strong authentication mechanisms for the office WiFi network, and segregate the network provided to students for their BYOD devices from the institution’s internal network.
5. Establish processes to enable the board to provide sufficient attention to information security and for there to be ample funding for staffing and controls.
6. Identify the data that is most valuable to the institution, and implement targeted security detection and response capabilities that are tested on a regular basis through “tabletop” and “red team versus blue team” exercises.
7. Conduct external and internal penetration testing to identify vulnerabilities. Assign owners to the resulting remediation activities and track for completion.
8. Apply appropriate access governance control to enable access to be granted based on a “need to know” basis, with the appropriate segregation of duties.

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\(^8\) Botnets are groups of computers that, unknown to their actual owners, are compromised and controlled by threat actors who use them to perform malicious activities.
Helping higher education institutions build a better working world

EY has helped many higher education institutions identify and manage cybersecurity risks through providing strategic recommendations, performing investigations into cybersecurity incidents and recommending tactical initiatives. Here are some examples.

**Case study 1**
A higher education institution in Canada experienced a security breach that compromised its staff’s credentials. An internal investigation indicated that a student had used a physical data logging device to target specific individuals and log into the institution’s grade management system to compromise the integrity of its academic data.

In response to the breach, the organization produced an incident briefing report and asked EY to assess it. We conducted a series of interviews, and provided a set of tactical and strategic recommendations.

**Case study 2**
A higher education institution was the target of a DDoS attack that had a significant effect on its firewalls. The institution’s incident response team and the firewall vendor both worked to stop the attack, but with limited success.

EY was asked to investigate what happened and what could be learned to prevent a similar attack in the future. We approached our review in three ways:

1. An analysis of traffic patterns to understand more about the details and extent of the attack
2. An architecture review to compare against leading practices and understand where improvements could be made
3. A cyber threat intelligence assessment of internet “chatter,” found in deep and dark web forums, to determine if the institution was being discussed in relation to the DDoS attack

We provided tactical and strategic recommendations that included creating an incident response plan, partnering with third-party DDoS mitigation service providers, and enhancing logging and monitoring capabilities to help enable earlier identification of attacks and the ability to perform in-depth investigations.
As “ecosystems” emerge, networked platforms become increasingly important in the business world. Platforms are being built in fields as diverse as health care, education, energy and government to create new efficiencies through unlocking hidden resources and discovering new forms of value. This article explores and explains ecosystem-centric business models, enabled by platform thinking, that are connecting providers and consumers or users more directly.
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Competition in the digital era is, simultaneously, both an enormous opportunity and a challenge for most organizations. In fact, most companies are either thinking about, or pressing ahead with, digital transformation initiatives.

The creation of “ecosystems” – the convergence of separate entities into rich networks with variable sets of relationships between producers and consumers – is ubiquitous in today’s business world. The rise of these ecosystems forces businesses to move beyond traditional industry silos and to go from organization-centricity to ecosystem-centricity, resulting in an increasingly networked world.

One of the most important economic and social developments of our times is the rise of the platform as a business and organizational model. Today’s biggest, fastest-growing and most disruptive companies are founded on platform-based business models. Companies such as Apple, eBay, Uber and Alphabet (the parent company of Google) act in ecosystems and connect diverse partners in a network of businesses.

What’s more, platforms are the driving force behind the transformation of many economic and social arenas – from health care to education, energy and government, they are changing the world forever. These new business models use technology to connect people, organizations and resources in an interactive ecosystem in which unlimited amounts of value can be created and exchanged. The concept may sound simple, but it is radically changing businesses, the economy and, above all, the way in which we interact in the digital age.

Practically any industry for which information is an important ingredient is a candidate for the kind of disruption that is enabled by platforms. This includes, for example, businesses in media and education, where information is the product, as well as businesses that value access to information about customer needs, behaviors, prices, market trends, and supply and demand.
Platforms represent a powerful catalyst for rich ecosystems that can enable exponential growth. How they do this is by creating new markets, due to the fact they are connecting providers, consumers and users directly, mediating their interactions by leveraging information. By doing so, they help create new economic value and scale the potential for learning across entire ecosystems, as platforms dramatically enhance our ability to communicate, share and store information. They also help to connect with internal and external stakeholders.

The power of the platform
Platforms represent a powerful catalyst for rich ecosystems that can enable exponential growth. How they do this is by creating new markets, due to the fact they are connecting providers, consumers and users directly, mediating their interactions by leveraging information. By doing so, they help create new economic value and scale the potential for learning across entire ecosystems, as platforms dramatically enhance our ability to communicate, share and store information. They also help to connect with internal and external stakeholders.

Designing new platforms
For successful implementation of new platforms, organizations must have a clear understanding of the economic principles and business design across one or more ecosystems. This means they will need to move away from traditional business principles that explain the management of linear supply chains and conventional service models.

Digital business platforms can create massive opportunities for organizations because they provide the infrastructure for our increasingly networked world.
As a consequence of increased interactions and more pervasive connectivity, there is the potential for value to be created and exchanged. However, organizations are missing out on this potential due to a lack of understanding of the economic principles and business design that govern the execution of successful platforms. Instead, success is determined by functional integration and network orchestration, rather than horizontal or vertical integration – this shift requires new ways of thinking and implies a new business logic. Platform principles and designs are counterintuitive compared with traditional ways of doing business. As a result, many platform implementations fail.

**Innovative platform thinking centered on customer needs**

Digital platforms connect every thing, every place and every person; therefore, they are fundamental to satisfy the demands and needs of all those connected via the platform. The important difference is that producers, consumers and users interact with each other and use the software – instead of using a software.

In the past, no matter which industry, customers expected instant gratification and more intuitive, real-time and integrated solutions in their interactions with providers. Now, it is the customers themselves who have become active, independent partners in the ecosystem, sitting at the center of its strategy and reshaping their own needs. They are able to define their own journeys outside of the business’ control. The result is that consumers’ expectations have increased dramatically; they have also become considerably more empowered. As each individual, whether formally or informally, collaborates for the mutual benefit of the entire ecosystem, this ultimately leads to more information, allowing more choices and creating more value.

It is this change in pathways that needs to be better understood by many organizations as they begin to realize that, in the world of digital business ecosystems, they are no longer the only players in the market. The need to enter alliances and partnerships across the business platform should be viewed, by all stakeholders, as an important enabler to meet new growth opportunities.

The right technology enables collaboration: a digital experience platform that serves providers and consumers or users along every step of their journey and provides individual value propositions across the networked ecosystem. Consequently, companies need a digital experience and technology strategy that is informed by the needs and digital behaviors of their stakeholders. In fact, the platform must pinpoint and affect every users’ journey.
The aim, therefore, is for the platform’s focus always to be on the customer journey, as it connects to clients, manages suppliers across industries, and enables communication and data sharing while increasing sales of products and services. The tricky part is that the solution needs to fit the requirements of all of its players, i.e., to benefit customers while simultaneously improving the business performance of both the organization and its partners.

Platforms will replace “pipes”
If organizations are to realize the benefits of a platform-based ecosystem, they must move away from traditional value chain creation, also referred to as “pipe,” toward “platform thinking.” This refers to the way in which users can create value on the platform for others to use; products and services are no longer simply sold and consumed.

Customers’ expectations are increasingly being shaped by their interaction with successful e-commerce companies that allow them to change their needs and wants within an eyblink. The trade on business platforms will generate tremendous amounts of data that can be analyzed to sell even more products and services. Some experts predict that, in the future, only platform businesses will exist.
The need to enter alliances and partnerships across the business platform should be viewed, by all stakeholders, as an important enabler to meet new growth opportunities.
Enabled by these platforms, products and services can be traded more quickly and, importantly, among new partners. Digital business platforms facilitate the simplified trade of not just the products and services of the organization, but also all the partners that are connected via the platform.

From a business to business (B2B) commerce perspective, digital business platforms allow participants in the ecosystem to connect with the capabilities of other partners and make them available to their customers in ways that create significant value for the platform participants and the customers. These are simple mechanisms to increase the sales and revenues of both the platform operator and the connected partners.

Such a model provides the necessary transparency that organizations need to be able to innovate and adjust to customers’ changing demands in an agile manner. It becomes cheaper and easier to add new products and services, as real-time information provides instant insights into customers’ buying behavior.

**Health care: an example of a new ecosystem**

When we think of the traditional health care ecosystem, one would expect it to include physicians, nurses, pharmacies, hospitals and assurers. But there are new entrants now. Patients no longer rely just on their physician to improve and sustain their overall health. That is why we see players from industries such as sport and fitness, nutrition and wellness, plus technology and data experts, entering the arena.

The health care ecosystem is fully extensible, enabling patients, depending on their needs, to have access to different providers and suppliers that offer a multitude of products and services. From the patients’ perspective, they have access to a coordinated, online communication platform that is complementary to the face-to-face interactions with health care professionals. It provides an additional source of expert assistance to help patients navigate the health landscape.

For pharmaceutical companies, the digital platform provides insights on how patients are using their products. This data can be used to direct the development of new therapies or improve current treatments and offerings, thereby selling more products and services via the platform. One well known example for tracking and monitoring a patient’s health status is wearable technology, sending real-time information to the physician for immediate intervention or advice on better health outcomes, if required.

**IT and data analytics as an enabler for digital business platforms**

Nowadays, building and scaling up platforms has been made much simpler and cheaper by the use of IT, which allows for almost seamless participation, thereby strengthening the network’s effects. IT enhances the ability
to gather, analyze and exchange huge amounts of data, which increases the platform's value to all parties involved.

For organizations, the transmission of enormous volumes of data and information, every minute, provides significant opportunities as ideas and innovations between connected partners are circulated. Yet, new technology brings new capabilities and an increased risk of uncontrolled data disclosure. Understanding cybersecurity and data protection is, therefore, an inevitable prerequisite for sustainable success in the digital era.

At EY, we believe that a strong business reputation is rooted in a robust data privacy and information security program. Organizations must have a well-articulated security and privacy strategy in place when setting up a digital business platform. Only then will organizations succeed in attracting partners onto the platform.

**Building the necessary capability**

Even the strongest and most profitable players in the market need to rethink their strategies to sustain economic growth in this digitally disrupted world. We see many organizations struggle to understand fully the impact of digitalization. We also see many organizations succeed in making digital part of their strategy, developing new business models that emerge in the form of digital business ecosystems.

Creative thinking can help organizations anticipate and understand the potential disruptions that could affect their business. We have seen how it has helped businesses build competitive advantage from uncertainty by being proactive in developing a networked business model for their organization or area of responsibility. In so doing, they have opened themselves to new perspectives,
identified opportunities and taken a step toward the future way of doing business.

Traditional industries, such as hotels and television channels, are in a state of upheaval, experiencing disruption from platform business models. Maybe it hasn’t happened in your industry yet, but all that means is you are likely to be next. Businesses that do a better job of harnessing the power of platforms will win by turning disruption into a competitive advantage.

The aim is for the platform’s focus always to be on the customer journey, as it connects to clients, manages suppliers across industries, and enables communication and data sharing while increasing sales of products and services.
India has been quick to embrace digital technology and is one of the top three countries in the world in terms of its internet usage. Both business and the Government are keen to reap the benefits that next-generation digital technologies can bring. Yet, often, their haste to adopt a digital approach encourages organizations to overlook the need to develop a considered digital strategy. The result of this abrupt adoption can be digital chaos rather than digital transformation.

How India is conquering digital chaos
That digital has captured the imagination of business is a given. A single word with several connotations, digital has become synonymous with every sphere of life today. Enterprises want robust digital strategies and tools to be embedded in every part of their business functions. Consumers expect to be connected, informed and entertained, even as they save time, money and energy. And governments expect to be able to connect, enable and empower the people who they represent. Digital has moved from being a sideshow to the main attraction in boardrooms as leaders wrestle with the idea that either they embrace digital or become irrelevant.

Even as businesses run headfirst into transforming themselves into digital businesses to escape impending extinction, they might be rushing toward “digital chaos.”

This is characterized by disjointed departmental policies, procedures and practices leading to duplication of efforts, data leakage or theft. Other symptoms include inconsistency and business loss.

Be it the e-business that charges differential prices to consumers, the corporate website that provides different facts in different places or the bank that is hit by a data theft of its customer records—each of these can be viewed as part of a greater malaise: digital chaos.
To satisfy demanding customers and yet still sustain the business, everyone is in haste to adopt digitization. And Indian enterprises are no different. India is on the edge of digital transformation: the Government, industry bodies, corporates and academic institutions are all trying to leverage the power of the internet to deliver last-mile connectivity and drive business gains.

Irrespective of the nature of the enterprise – Indian or global, private or public – there is a need to tread cautiously when adopting this disruptive technology. The power of digital needs to be governed and understood to the very core of the organization if misuse and chaos are to be avoided. Digital tools need to be aligned with the broader business goals if the essence of digital, as a concept, is to be captured completely.

**India has been startled by the power of internet**

India is rapidly adopting digital technology with a focus on providing internet connectivity to a larger user base. India is expected to have surpassed the US and become the second-largest country in terms of internet user base as of December 2015 (402 million, up 33% year on year). The mobile internet user base has grown at a robust rate of 77% year on year to 306 million during the same period. Widespread availability of low-priced smartphones has enabled users to mobilize their digital world. The average consumption of mobile data per smartphone user in India is expected to reach 2.08GB per month by 2020, compared with a mere 430MB in 2015. With such rapid growth, India is all set to adopt the next-generation digital technologies.

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Enterprises are eager to join the rush for digital

In August 2014, the Indian Government launched the Digital India program with an estimated investment of INR1.13t over three to five years to widen digital access for India’s population. This opened up a plethora of opportunities for various companies to build broadband infrastructure, create identity solutions, design mobile-based payment systems and develop remote health care solutions.

To join the rush for digital, various enterprises are looking to adopt next-generation technologies as a means to open up new channels for product and service delivery, improve employee productivity, customer experience and vendor satisfaction, and bring agility into the business model.

However, many companies are so overwhelmed by the digital phenomenon that they are embracing the technology without understanding what their needs are and the best way to generate returns. They fail to understand which technologies should be deployed to suit the business’s requirements best and what kind of data needs to be analyzed. As a result, they are exposing themselves to multiple risks.

Irrespective of the nature of the enterprise – Indian or global, private or public – there is a need to tread cautiously when adopting this disruptive technology.

Does abrupt digital adoption result in digital transformation or digital chaos?

Digitalization is necessary, but the inability of organizations to articulate clearly their digital enterprise strategy and digital governance approach is creating digital chaos. This is because, currently, there are no established best practices for how to digitalize a business, only a few scattered examples.

For instance, digital media enables a company to attract large numbers of customers by pushing communications via email and social media. However, if the right message is not communicated to the right customer at the right time, the posts will lose their relevance and become spam, leading to an unnecessary increase in the company’s costs.

One India-based company provides an example of how digital chaos can impact the business. The organization put new areas of technology, such as cloud computing and enterprise mobility, at the heart of its strategy. The idea was good in theory but, in practice, it proved to be the wrong move, as the company lost focus on its core business, resulting in a fall in both revenue growth and operating profit.

Many companies are so overwhelmed by the digital phenomenon that they are embracing the technology without understanding what their needs are and the best way to generate returns.

Figure 1. Does the organization have a clearly defined digital marketing strategy?
How India is conquering digital chaos

There are many reasons why companies could find themselves in such a predicament, so what can be done to help avoid this? One important aspect is to have a clearly defined road map for how the strategy will be executed. A second success factor is strong vision and support from leadership. In an economic crisis, it’s easy to become too focused on saving the existing business by lowering costs rather than through discretionary spending on emerging technologies.

And yet, according to a recent report, there are many enterprises adopting digitalization without a strategy in place. Fifty percent of the marketers surveyed admit that they have active digital marketing programs, but no defined strategy.5

These companies need to realize that there are multilevel disadvantages to adopting digitalization without a proper strategy in place. Digital chaos can not only lead to reduced profits, it also risks enterprise goodwill and innovation capabilities.

For example, one major India-based business decided to move to an app-only strategy on the basis that the bulk of its traffic came from mobile rather than desktop. However, the decision didn’t take into account an analysis of where users came from. Faced with potential losses in both sales and traffic, the company soon shifted back to a strategy that included mobile websites and mobile web apps.

384% increase in mobile data consumption expected by 2020 compared with 2015

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Digital governance is vital as it helps to establish rules and processes for sharing, editing, distributing and consuming data, thereby reducing the possibility of misuse.

**Figure 2. Implications of digital chaos**

| Lack of interest or awareness among leadership and the workforce in embracing digital tools | Cybersecurity threats and regulatory fines |
| Lack of preparedness among suppliers and vendors for increased digital collaboration | Reputational risks |
| Lack of awareness or preparedness among customers in engaging digitally | High costs associated with digital technology and related transactions |
| Poor linkage between adoption of digital technology and value chain efficiency | Inability to generate benefits from innovation or R&D from increased adoption of digital technology |
How can firms make sure they are benefiting from digital?

To drive the benefits from digitization, organizations should draw up a road map that puts digital thinking at the heart of the business. The objective is to define a clear digital strategy together with metrics that can measure the anticipated differential created by a digitalized versus traditional business. The expected return on investment should be calculated on implementation, as this will help the company decide on the feasibility of digital solutions (based on the nature of the business), secure money from investors and build a relevant digital strategy.

Data security is one of the key pillars of a digital strategy, as the threats of cybersecurity (e.g., identity theft, phishing, snooping and cyber terrorism) have become an increasing cause for concern with the adoption of next-generation technologies.

For example, one Indian conglomerate wanted to transform its existing IT setup so that it could automate some of its processes. While doing so, it focused primarily on implementing an information security environment to avoid any cybersecurity risks. It conducted a thorough review of the security architecture of its infrastructure components, sales management information system (SMIS) and marketing and distribution portal to assess any vulnerable areas and address any gaps in security. As a result, it could quickly identify areas in the IT environment where there was information leakage and create security frameworks to prevent the possibility of unauthorized access to critical data.

Similarly, one global organization, which has a big focus on R&D, realized the importance of cybersecurity in its R&D ecosystem. It analyzed the potential areas for information leakage in its digital setup. It then initiated cybersecurity awareness training among its key stakeholders, and developed a comprehensive security policy and network security framework to prevent any unwanted data drainage.

Digital governance is also vital, as it helps to establish rules and processes for sharing, editing, distributing and consuming data, thereby reducing the possibility of misuse. Many companies have appointed a dedicated digital leader who is responsible for closing the security gaps, formulating a digital strategy and dealing with client concerns for digital customer services. Typically, they will also ensure the organization is aligned to leading governance standards and frameworks, and will clearly segregate individual accountability to aid efficient governance.

A comprehensive digital governance model will require investment, but the benefits are worthwhile: improved performance, reputation and competitive advantage.

An additional consideration for organizations is whether to adopt a dual-speed IT operating model. This would enable CIOs to focus on an IT ecosystem that comprises rapidly evolving digital solutions and robust enterprise IT that would sustain core business processes. This approach would help bring an element of balance between the company’s current technology and emerging disruptive technologies.

It is not all in the hands of business – governments can also play an important role in the successful implementation of digital technologies. By providing regulatory support to the ecosystem with adequate laws on data privacy and data handling, and by levying heavy fines in the event of data breaches, governments can help facilitate better governance for businesses and avoid abrupt or unplanned digital adoption.
Adopt digital, but with caution

Digital is no longer a distant dream. It is here. But any haste in its adoption can lead to more harm than good. A well thought-out digital strategy, together with adequate government support, can help organizations flourish in the digital era and translate their digital investments into tangible benefits.

It is not all in the hands of business, governments can also play an important role in the successful implementation of digital technologies.
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