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Why Companies Must Innovate or Die

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Abstract

Many once highly successful companies now no longer exist, appearing to be caught out by changes in the marketplace. Understanding why these companies have failed is crucial to preventing the same mistakes from being made in the future. Companies fail as a result of their culture towards disruptive innovation, caught out by the changes disruptive innovation brings to their industries termed the innovator's dilemma. Establishing a culture that nurtures disruptive innovation is key to survival. Today, Industry 4.0, is accelerating the speed of change, bringing innovations to market quicker than ever. Companies must appreciate how Industry 4.0 will change their industry, understanding the effects of globalisation, increasing competition, increasing consumer expectations and the advancing technologies Industry 4.0 offers. Case studies of Blackberry and IBM provide examples of companies who have failed and succeeded in responding to disruptive innovations in their industries. To respond to disruptive change in the era of Industry 4.0, recipes for being innovative are discussed; revealing small companies have the advantage when being innovative.

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List of Acronyms

- IMF: International Monetary Fund
GDP: Gross Domestic Product
ROI: Return on Investment
R&D: Research and Development
RIM: Research In Motion
OS: Operating System
PDA: Personal Digital Assistant

List of Definitions

- Industry 4.0:** This is the next phase in the digitisation of the manufacturing sector; bringing cyber-physical systems, the Internet of things and cloud computing to the industry.
- GDP Growth:** Is the market value of all the goods and services produced in a country in a particular time period.
- Value Propostion:** A company's product or service offering that makes it attractive to the customer.
- Competitive Advantage:** The region between what a company offers and gives value to customers, whilst not being offered by competitors.
- Value Chain:** A chain of activities which allows firms to create values and competitive advantages
- Value Chain Economics:** Study of economics that investigates economics questions that arise in the context of value chains
- Value Networks:** Where value is brought to previous non-consumers, who either could not afford the product or find new value the product brings
- Incumbents:** Companies that own a considerable market share in the industry

1 Introduction

What do Blackberry, Blockbuster, Tower Records and Borders all have in common? All once leaders in their respective industries; now none exist or are shells of their former selves. What has caused these great companies to fail? After extended periods of unquestionable success, how have these businesses been caught off guard, displaced by radical changes in the marketplace?

All these companies faced disruptive innovations and failed to recover; an answer first highlighted by Clayton Christensen [1]. Today, the rate of disruptive change has increased faster than ever before, as we enter the 4th industrial revolution (Industry 4.0). Today the average company lifespan is only 15 years, while back in the 1920's this was deemed to be 67 years [2]. The pace of change is set to accelerate even faster, making the findings of Christensen work today, more prominent than ever before. It is vital that businesses grasp the effect that disruptive innovation in the age of industry 4.0 will have on their industry before they are caught out.

1.1 Why There a Global Need for Innovation

Innovation, or lack of innovation, is a global problem. The 2015 International Monetary Fund (IMF) report [3], highlighted that the world is facing a global productivity crisis. A result of an upcoming sharp decrease in demographic growth.

Gross Domestic Product growth (GDP) is a measure of economic growth in the global economy. It comes from demographic growth, where more jobs increase the number of people in employment, and productivity growth, where employees produce more value in less time. For many mature economies, demographics have shifted as their population's age. Countries such as Germany, Italy, Japan have already hit their peak working population^a. The result will cause demographic growth to drop, as more mature economies plateau in working population size. Without demographic growth, it is up to productivity growth to continue to grow the economy. If productivity growth continues at its current rate, it is likely that global GDP growth will decline by 40%^a. It is, therefore, vital for productivity to grow stronger than it has in the past.

GDP growth is necessary because:

- it expands economic opportunities for those who are poor/ vulnerable, driving people out of poverty
- for mature economies, rising pension costs, social obligations and public debt is easier to manage with a growing economy
- it makes resources available to spend on eradicating diseases and issues such as global warming, critical for the planet's long-term survival^b.

For many, *innovation* is viewed as the solution to this global productivity crisis^c. Companies that push innovation and create new disruptive innovations reshape the marketplace, stimulating the economy. Innovation can increase workplace productivity and in the case of incumbents, provide job security for its employees^d. Being innovative, however, can be difficult for well-established companies. For most

^aSee page 5 and 6 of [4].

^bSee page 14 & 15 of [4].

^cSee page 3 of [5].

^dSee [6] for more information on productivity's relationship with innovation

businesses, it is found they are better executors than innovators [1], succeeding through optimising their existing businesses and less by innovating. However as will be discussed, continuing to push optimisation over innovation can catch companies out.

1.2 What is Innovation?

Before delving into the topic of why companies must innovate or die, it is important to outline what is meant by the term *innovation*. The term "invention" is often confused with innovation. Invention lends itself to the creation of a new technology (often falling out of a research lab). The technology does not necessarily lead to monetization, as the value that invention brings may not be apparent. Innovation however, creates *value* often by coupling "inventions" with creative business models.

Innovation should not be equated as a "light bulb moment", where the idea springs to life in the form of a product; instead, innovation should be viewed more broadly, seeing where that technology can bring value to customers. While ideas are important, the real problem most large companies face is about understanding how these inventions can grow into successful innovations. Being a successful innovator requires the unity of products, services, processes and business models united, creating new innovation-led growth for companies^e. In the words of Eric Schmidt and Jonathan Rosenberg, "For something to be innovative, it needs to be new, surprising, and radically useful" [8].

The work of Clayton Christensen [1] saw innovation as falling into two categories, sustaining and disruptive.

1.2.1 Sustaining Innovations

Sustaining innovation is where a technological improvement helps to develop existing markets creating more value for the consumer. These new technologies can still be discontinuous or radical in nature, while others are incremental [1]. The majority of businesses compete in this manner, releasing new products as evolutions of the past. *Sustaining innovations fight to meet customer's current needs*. Sustaining innovations are witnessed all the time, being updates to mobile phones increasing battery life, screen resolution or camera quality. Each innovation helps to sustain or improve mobile companies (e.g. HTC, LG, Samsung) market share, keeping in the competition.

1.2.2 Disruptive Innovations

These are innovations that shake industries. These create entirely new markets where customers and value networks create new value propositions. Disruptive innovations come through coupling new technology with creative business models, creating a disruptive effect on the market. They often appear to have lower performance in the major features valued by the market at the time, so instead these innovations begin in small niche markets, where their value is apparent to the target customer. *Disruptive technologies and business models evolve to meet customers future needs, better than what is currently available on the market*. Disruptive innovations can take two forms [9]:

Low-End Disruptions: These are companies that utilise a new operating or financial model, shifting the returns in on their products. They don't create new markets but bring new low-cost business models that take away the least attractive competitors customers. One Low-end disruptor was the Korean automaker

^eSee the Essentials of Innovation podcast available for free on iTunes, [7].

KIA when it entered the EU and US markets. The cars they brought to the market were not revolutionary but were much cheaper than many of the American or European alternatives; this took significant market share away from the competitors who had sub-par products, forcing US and EU automakers to change their product offerings.

New-Market Disruptors: These are products that create entirely new or emerging markets, currently not being served by incumbents in the industry. Often these products focus on customer behaviours and provide something the customer wants without it being apparent. Smartwatch makers, act as a good example. These businesses are not targeting traditional Swiss watch wearers, but instead, 18-34 years olds who value the time saved from looking at their phones which a smartwatch provides.

There are also innovations that fall under both these categories termed **Hybrid Disruptors**. Most incumbents follow the path of becoming great developers of sustaining innovation, but often don't recognise the effect of disruptive innovations can on their markets. It is this which can doom the company to failure.

2 How Innovation is Killing Modern Companies

There are both external and internal factors at play causing successful companies to fail. Externally, Industry 4.0 is creating enormous opportunities for innovation but is also applying a tremendous amount pressure on incumbents, forcing companies to innovate. Some of the most prevalent forces of today are discussed in section 2.2.

The second force, and often more challenging, comes in successfully valuing innovations. It is often incumbents who develop disruptive technologies first [1]. Commonly, incumbents try to apply this new technology to existing customer, product architectures or value networks. Technologies at this stage are often too novel to contribute to the existing value networks the incumbent operates. Looking to new market's, the technologies value becomes more apparent. However, these new markets tend to be niche, too small to be attractive for a large company. Both approaches show little return on investment (ROI) when compared to the incumbent's current product offerings. On analysis, management acts in the company's best fiduciary interests rejecting continued investment in the new technology.

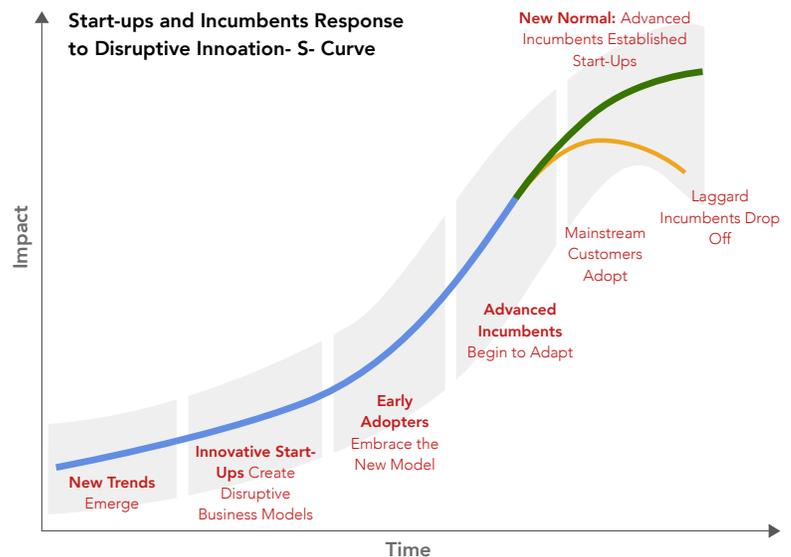


Figure 1: Explanation of how disruptive innovations are adopted by Businesses [10]

An innovative new start-up with little to lose comes along, deciding to bring that new product to market. Its' small size gives it nimbleness, agility and a small cost structure; all things needed to test a new technology responsively. By understanding how to build, measure and learn re-iteratively, ^f allows the new

^fSee the Lean Start Up by Eric Reis for information on startup techniques

entrant to quickly find where this new technology fits, turning that technology into a disruptive innovation.

Sequentially, the disruptive innovation's niche market begins to grow, working up the "S-curve" shown in figure 1. As impact grows, the innovation starts to enter the larger mature marketplaces, attracting these customers who now see the value in the disruptive innovation. For the unprepared incumbent, failing to recognise a disruptive innovation breach into mature markets, can be lethal. By jumping on the band wagon too late, the incumbent can get caught out. Timing, therefore, is crucial.

The innovator's dilemma is, therefore:

"Following sustaining innovation in the short term may appear to be the best decision but can result in dooming the company. Failing to recognise disruptive technologies effect on the market, can catch out incumbents. It is vital that the correct attention is given to both sustaining and disruptive innovation [1]. "

2.1 Internal Forces - The Effect of Company Cultures on Innovation

Understanding some of the main challenges companies face when tackling the "innovators dilemma" can help to manage disruptive change. Pushing innovation within a company can be difficult due to company culture. Research conducted by PA Consulting identified a group of 'innovation leaders' across sectors. These leaders were better innovators due to their embedded cultures of innovation, translating their innovation efforts into financial rewards^g.

At Google, Larry Page and Sergey Brin believed that creating a culture around "helping the customer" and "making the world a better place" was vital to achieve long-term success^h. Setting a culture that nurtures innovation can be difficult for incumbents; once set it can be challenging for employees to change. Culture rather than the business model is often the critical reason companies fail to respond disruptive innovation. Below highlights a few of the main cultural issues companies face.

Companies View Innovation as the Role of the Research and Development (R & D) Department: This view severely limits a companies ability to identify and develop breakthrough ideas with the potential to transform their industry. When a corporation gets a good idea, it is often wasted. In the UK, £127bn is spent on knowledge each year,ⁱ where over half these ideas are killed before they produce any revenue^j. As knowledge is not quantifiable, companies tend to give a budget to the R & D department and adjust this figure in accordance to the companies yearly profits. Often good ideas are stopped with these changing budgets, and the lack of commercial interest can be demoralising for creatives at work. As innovation is not just technology, it requires collaboration across a company to understand how to couple a good idea with a creative business model, to find the best value offering that technology can bring to customers.

Companies are Not Trying to be Disruptive Technology Pioneers: Few organisations push to create disruptive innovations. Instead, they seek to jump on the "hype curve"^k at the moment when a technology is mature, alleviating its' risks. Research by PA Consulting found that only half of organisations try to be

^gSee page 3 of [5].

^hSee Page 54 of [8], to read about Googles IPO.

ⁱTaken from the Abstract of [11].

^jSee page 11 of [5].

^kTerm attributed to the Garter Hype Curve, see [12] for more information

pioneers in innovation^j. Where this culture is taken, timing is critical for making sure the company does not get caught out, highlighted in figure 1.

Companies Look to Buy Innovation As Opposed to Create It: A huge amount of large companies rely on buying instead of creating innovation, a traditional attitude to innovation that can be successful, but comes with risks. To be successful it must be carried out within a culture that understands and actively nurtures innovation^j^l.

2.2 External Forces - The 4th Industrial Revolution and its Effect on Incumbents in the Market

"Digitisation is rewriting the rules of competition, with incumbent companies most at risk of being left behind."

- Martin Hirt and Paul Willmott, *Strategic Principles for Competing in the Digital Age* [13]

The 4th Industrial Revolution is changing the competitive landscape. Being *digital* is a term synonymous with being innovative. It also refers to being responsive to the new technologies Industry 4.0 is bringing. Both require being open, re-examining the entire way of doing business and understanding where the new frontiers of value are [10]. This is not the complete picture. For an innovation to be truly disruptive, the *invention* must be coupled with a creative business model. Therefore understanding current threats and having an open mind to a way these technologies could enter the market, is key. There are the four key opportunities and threats that "digital" is bringing to the market, these are:

Increasing Competition: Innovations are being brought to the market at an accelerated pace, while the barriers to entry which previously prevented businesses from entering are dissolving [14]. Both these factors are making the boundaries between industries more porous than ever before^m. New financing models such as crowdfunding have been integral to reducing these barriers. Businesses and startups are now able to access funds to turn their inventions into innovations. As a result, startups are on the increase, rising in the UK by 4.6% in 2016 [16]. In the financial sector, barriers to entry have never been lower. Financial technology companies such as Square are making it simpler and cheaper for merchants to accept payments, challenging traditional payment methods. For small businesses, the fixed fee rate coupled with the free card scanning technology that Square offers is a disruptive innovation challenging traditional merchant banks [17].

Increasing Globalisation: Internet technology is making it easier than ever for companies to go global. It has become much easier to sell products across the globe, challenging traditional, location-based markets. Businesses whose competitive advantage is based on their location should be wary of new global competitors testing their market. For many the solution to this threat is to change their business model from being local to global [14].

Increasing Consumer Expectations: Social media and location-based services have revolutionised marketing and customer experiences. These technologies are pushing the need for new ways to market products/services. The modern consumer is now more informed and has more options than ever before. It is vital that companies do not become complacent about the quality and brand reputation of their products and company; enhancing interactions among customers, suppliers, stakeholders, and employeesⁿ. The rise in consumer expectations is pushing companies to be customer-centric, previously aligned

^lSee section 4.1 for more information

^mSee Part 1 of: [15].

ⁿSee Page 2 of [13].

with other means.

Advancing Technologies: Technology is optimising processes and making services more efficient, industries failing to see these innovations may be caught out by sharp increases in productivity from their competitors [14]. Corporations no longer have an IT advantage, prominent back in the 1980's. Harnessing new technologies can play a significant part in creating disruptive innovations in businesses respective industries. Big data and analytics are helping companies to understand their customers better, improving management decisions [13].

3 Examples of Innovations Role Within Companies: Successes and Failures

To give context to the theory presented in sections 1 and 2, two examples are provided. One is a company that lost out due to its failure to innovate, while the other details a company who spotted the disruptive technologies and innovated its' business model in reaction.

3.1 Research in Motion (RIM) - How Blackberry Lost Out in the Mobile Market Wars

Blackberry once dominated the mobile phone market, targeting it's products to the professional worker niche. By offering excellent mail enterprise services, with a qwerty keyboard made it's phone highly attractive to its target market. In 2007 RIM was named the most valuable company in Canada [18] and at its peak in 2009, RIM (renamed to Blackberry) held a 20% market share of the mobile OS (operating system) market [19]. However, by 2011 blackberry's market share and revenue began to drop radically, resulting in job cuts and the step down of the CO-CEO's.

The release of Apples iPhone and Googles Android OS system in 2007 [20] brought two disruptive innovations to the market, facing Blackberry with the following threats:

- Open and Universal operating systems, enabling app developers to reach a large market share
- Useable pocket web browser building an experience on WIFI turning phones into portable computers
- A user experience that was not born from Personal Digital Assistants (PDA's), pagers and regular mobile phones [21]

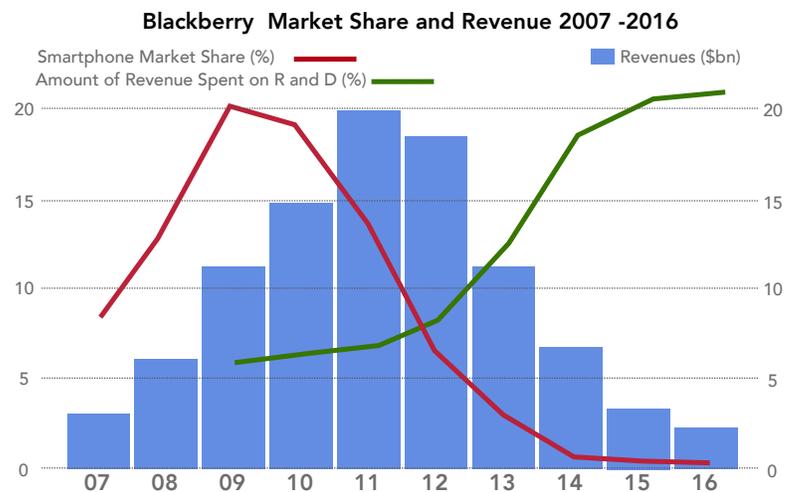


Figure 2: Graph Showing the Market Share and Revenue and Research and Development Spending of Blackberry from 2007 - 2016 [19]

These innovations blurred the distinction between the professional mobile market and the consumer market, pulling professional customers away from Blackberry's market. Blackberry failed to react to these disruptive innovations effectively not seeing this shift in the market.

In response to declining sales revenues, Blackberry increased spending on research and development (shown in figure 2). It fell victim, however, to relying on research and development (R & D) to be the sole creator of innovation. Blackberry's centralised, complex business structure at the time, prevented implementation of any disruptive ideas created by R & D. Cultural norms sabotaged many good ideas in the company such as "Don't challenge the big guys", the lack of support to take risks or a reward system based on status quo rather than improving the business^o. R & D instead continued to create sustaining rather than disruptive innovations, falling victim to the innovator's dilemma.

As of 2016, Blackberry is finally killing its mobile handset business, shifting its business model to provide enterprise services [22]. Blackberry's market share today is negligible, where its revenues are a small fraction of what they once were its peak. In summary, Blackberry's culture killed innovation, unwilling to change its business model and continuing to invest in sustaining innovation doomed the company to failure.

3.2 IBM - How IBM Managed to Survive Disruptive Threats to the Mainframe Computer Market

Of the top 25 companies on 1961's Fortune 500 list, six remain today [23]. IBM remains as one of those few. Through continuous innovation and constant evolution of both its business model and business portfolio, IBM has managed to survive the attack of numerous disruptive technologies.

The dawn of personal computers exemplifies disruptive innovation. The technology created a new mass market for computers; previously only expensive mainframe computers were sold, exclusively to the corporate and education sectors [24]. Back in the early 80's, IBM nearly faced bankruptcy when its leaders missed the disruptive change which desktop computing brought to the mainframe computer market. In response, IBM jumped into the PC market selling its hardware alongside its mainframe computers. The mainframe computer business, however, faded, creating a cash crisis in the early 1990s for IBM. Then CEO Louis V. Gerstner Jr. saved the corporation by changing IBM's business model, from selling hardware to providing software and services. While cutting costs, Gerstner reversed the move to spin-off IBM's business units into separate companies. Understanding IBM's customers, he recognised that one of IBM's greatest strengths was its ability to provide integrated solutions for clients; a united firm held more value than a subset of its parts [23]. It was this business model innovation that allowed the company to survive.

IBM was able to shift its business model effectively; remaining open to change while leveraging and enhancing its established competitive advantages. These include; strong, long-term customer relationships, deep scientific and research capabilities and an unmatched breadth of technical skills in hardware, software and services. As a result, IBM changed its image from an IT hardware company to become a global services organisation helping its customers create insight from data. Today IBM delivers new value by bundling existing and new IBM technologies with its mainframe units to provide cloud-based software and services in state-of-the-art data centres [25]. An innovative business model, not offered by any competitor.

Today IBM remains as one of the top innovation leaders^p. IBM's \$7 billion Smarter Planet business is installing smart grids for water conservation to using big-data analytics to improve urban services [26], acting on the forefront of Industry 4.0.

^oSee Slide 12 of [18].

^pRanked 13th most innovative company of 2015 by Boston Consulting Groups Study, See Page 4 of [26].

4 Recipes For Good Innovation Practices

The best way to combat the threat of disruptive innovation threat is to be innovative; this is not always straightforward as there is no perfect business model for being innovative. There are however some good principles which companies can follow.

4.1 Responses to Size

Often incumbents ride on a wave of previous successes and have grown large sizes. For the business to be reliant on a disruptive innovation to generate its core income, significant returns on investment must be promised. Most disruptive technology markets start small, often failing to gain the interests of incumbents until too late. A company must, therefore, structure itself to allow new developments in disruptive technology to grow and basing the companies culture around promoting these innovations [1].

Spin-Off Business: One solution is to create an independent organisation where the businesses performance will be meaningfully reflected by the independent's profits and revenues. A recent example is Google's restructure, splitting the different product and service offerings under the umbrella Alphabet. Companies that don't compliment Google's "search business", have been separated to allow for more ambitious innovations to grow. ⁹

Acquisitions: Acquisitions of companies whose size reflects the disruptive market is an alternate method of incubating disruptive innovation. Acquired companies usually bring new value to the business through resources or processes. For a *resource* acquisition, integrating these resources into the operating company generally works, while *process* purchases should be left alone, preventing the operating companies culture and structure to impede the acquired value. Infusing the acquired company's values (through its process) into the parent company can generate the best results.

As the responses to disruptive innovation involve restructuring the way the business generates value, disruptive technologies tend to favour small, start-up companies. Finding ways big companies can "act small" nurtures innovation.

4.2 Market Surveying

Traditional methods of market surveying such as interviews and focus groups are less efficient than watching how customers interact the product. As section 2.2 highlights, Industry 4.0 means companies have to focus more on customer experience where often the customer won't intrinsically know what he/she wants until it is shown to them ^r. Companies should aim to gather as much data as they can observing how their market use products/ services and develop technology from these insights.

4.3 Form

Disruptive technologies are typically *simpler*, *more reliable* and *easier* than established technologies. These can be good signs to indicate whether a technology is disruptive or not [1].

⁹To see the current structure of Alphabet see [27]. For more information on Google's restructure from Larry Page visit <https://abc.xyz>.

^rSee increasing customer expectations section 2.2 for more information

4.4 8 Ways to Innovate

McKinsey completed an extensive inside-out survey, interviewing 3000 executives from 200 companies, to find the qualities companies need to be successful at innovating. Previously research on innovation looked at the top innovation companies (e.g. Apple, Amazon, Google) and saw how they performed. However, as these companies are all intrinsically different in how they are setup, it 's hard to gauge the best innovation practices to take away. By instead creating a list of possible "innovation attributes" and then looking at large amounts of data, this list could be whittled down to leave eight essentials attributes.

To be a good innovator, a company does not need all eight essentials and by having all eight essentials doesn't ensure the company will be the highest performing innovator.

Table 1: Table Showing the of 8 Essential Ways to Innovate, modified from [7]

	Do They Innovate?	Underlying Elements
Aspire	Do they regard innovation-led growth as critical? Are targets cascaded through the company to reflect this?	<ul style="list-style-type: none"> • Innovation vision and model • Required growth contribution from innovation • Cascaded targets and accountabilities
Choose	Do they invest in a coherent, time- and risk balanced portfolio of initiatives with sufficient resources to win?	<ul style="list-style-type: none"> • Clarity of innovation themes • Portfolio balancing time and risk • Resources sufficient for initiatives to win • Portfolio governance
Discover	Do they have differentiated business, market and technology insights that translate into winning value-propositions?	<ul style="list-style-type: none"> • Customer orientated business • Insight generation through several viewpoints • A value-proposition different from competitors
Evolve	Do they create new business models that provide defensible and scalable profit sources?	<ul style="list-style-type: none"> • Exploration of new business models • Changing value-chain economics • Diversifying profit streams • New customer groups
Accelerate	Do they beat competition by developing and launching innovations quickly and effectively?	<ul style="list-style-type: none"> • Planning and execution rigour • Cross-functional project culture • Customer and market based learning
Scale	Do they launch innovations at the right scale in the relevant markets and segments?	<ul style="list-style-type: none"> • Go-to-market planning • Launch-management • Operations increase
Extend	Do they win by creating and capitalising on external networks	<ul style="list-style-type: none"> • Strategic external networks • Collaboration skills • Partner of choice
Mobilise	Are their people motivated, rewarded and organised to innovate repeatedly?	<ul style="list-style-type: none"> • People priorities • Enabling structure • Supportive culture • Learning and adaptive organisation

5 Conclusions

Many companies are good at developing sustaining innovations. They can be produced using structured processes, have fewer risks, and their market value is easily recognised, building upon a business's current value network. Continuing to develop sustaining innovations and not acknowledge an upcoming disruptive change can be fatal.

Many companies see innovation as the role of a segregated R & D department building a culture that kills disruptive ideas by using the wrong metrics to measure the value of ideas. For companies that recognise the vitality of innovation, they look to copy competitors who remove the largest risks in the technology or look to buy innovation believing that it will fit harmoniously into that companies value network. Often these attitudes fail. Business executives must instead react to disruptive threats by building a culture that nurtures disruptive innovation effectively.

The world is facing a global productivity crisis and requires innovation to combat this threat. Industry 4.0 presents numerous opportunities for disruptive innovation to flourish. Industry 4.0 is accelerating the rate of change, making the competitive landscape more hostile than ever before. Companies, therefore, must respond by embracing all the values that Industry 4.0 is bringing. By responding effectively to Industry 4.0, will improve global productivity growth, bringing us all out of the global productivity crisis.

For engineers, it is important to recognise that no incumbent is too big that its is invincible to disruptive threats. It is up to engineers to strive to be innovative, recognising and pushing disruptive change in their industries.

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