



SPE's Management and Information Advisory Committee and
the Digital Energy Technical Section (DETS) present:




***"Technology Development
and Disruptive Innovation at the Petroleum
Industry"***



Daniel Delfino
CEO, R&D Technologies





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Daniel is the founder and CEO of R&D Technologies, a technology company which uses technical concepts to solve problems; reduce costs; increase profit and introduce innovation processes and articulate disruptive and sustaining technologies at all levels of a company.

He is the Co-founder of AEC, American Energy Consortium, a global joint venture with a mission to leverage knowledge and best practices at energy markets through consulting, auditing, training and performing projects using a global workforce of specialists.

Mr. Delfino graduated as a Mechanical Engineer and Electrical Technician where he began solving problems and developing technologies on the automotive and subsea O&G industries in 1999.

Throughout his professional career, Daniel has devoted time to studying aspects of innovation in the Petroleum industry and other markets; the dynamics of each industry and how they may interact and transform business and society.

He is passionate by the power that technology has in changing the human experience of living.



Daniel Delfino
CEO, R&D Technologies



Poll Question



What is your job title?



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Poll Question



Which is your main activity:



5

Poll Question



Who is your employer?



6

Poll Question



How many years of experience do you have?



7

Poll Question



What geographic region are you from?



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Technology Development and Disruptive Innovation at the Petroleum Industry



Agenda:

1. How do we define the type of innovation needed and Why is this is important?
2. Why is the O&G Industry not Innovative? Is it changing?
3. How do we transform a business from Engineering Solutions to a Technology Provider?
4. How can scenario planning prepare us for the future of the industry?
5. The rise of Super-Technologies



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How do we define the type of innovation needed
and Why this is important?



Challenges & Opportunities



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How do we define the type of innovation needed
and Why this is important?



Challenges & Opportunities



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How do we define the type of innovation needed
and Why this is important?



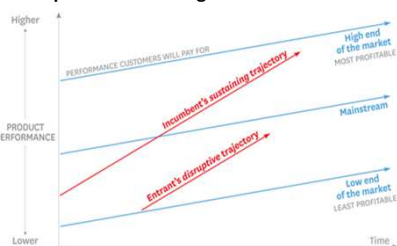
Definitions: Disruption X Sustaining Innovation

Disruption:

- Low-end customers with a "good enough" product.
- New-market footholds, disrupters create a market where none existed.

Sustaining (Focus on most profitable customers):

- Incremental advances;
- Major breakthroughs;



SOURCE: CLAYTON M. CHRISTENSEN, MICHAEL RAYNO, AND RORY MCDONALD
FROM "WHAT IS DISRUPTIVE INNOVATION?" DECEMBER 2015

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How do we define the type of innovation needed and Why this is important?

Orient Yourself and Set a Direction: Inspiration on Similar Markets Help the Decision

Where are you now? (Left side of the matrix)

Where do you want to be a decade from now? (Right side of the matrix)

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Why is the O&G Industry not Innovative? Is it changing?

FIGURE 8: Innovation Performance of Top 200 Innovators by Industry

FIGURE 9: Most Influential Scientific Research Institutions in Oil & Gas (2006-2016)

Institution	Country	# of Papers	Change in Research Output
United States Department of Energy (DOE)	US	187	2.34
Stanford University	US	184	2.54
Imperial College London	UK	112	2.21
Osaka Institute of Technology	Japan	104	2.08
South University of Science	China	102	1.95
University of Texas at Austin	US	98	1.95
Technische Universiteit Delft (TU Delft)	Netherlands	95	1.84
University of Science and Technology	China	89	1.43
Technical University of Denmark	Denmark	82	1.35
University of California, Berkeley	US	87	1.54

TABLE 10: 2017 vs 2016 Innovation Performance of Top 200 Innovators

Industry	2017	2016	% Change
Hardware & Electronics	34	29	17%
Manufacturing & Medical	14	15	-7%
Chemicals & Cosmetics	12	9	33%
Automotive	7	9	-22%
Household Goods	6	6	0%
Pharmaceuticals	6	7	-14%
Software	6	5	20%
Telecommunications	3	6	-17%
Oil, Gas & Energy	4	5	-20%
Aerospace & Defense	3	4	-25%
Institution & Government Research	3	5	-40%

REF.: Clarivate Analytics:
- Global Innovators Report 2017;
- The State of Innovation Report 2017;

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How do we transform a business from Engineering Solutions to a Technology Provider?

Optimism About 4th Industrial Revolution

- Positive anticipation of the 4th Industrial Revolution among executives (58%) and citizens (54%).
- Energy expected by citizens (61%) to benefit greatly from new innovation approaches to answer the energy challenges it faces.
- Innovation viewed by citizens (77%) as instrumental in solving global challenges — from environmental to health.

The Future of Work is Changing

- Executives are seeking problem solvers (56%) and creativity (55%).
- Citizens are embracing the start-up ethos and value flexibility (89%) and remote (79%) work.
- Few executives (17%) or citizens (13%) fear any negative impact on employment from the digital revolution.

- Set an Innovation Strategic plan;
- Define Methodology/Process and Tools;
- Establish Targets and KPI's;
- Communicate inside/outside the company accordingly;
- Empower individuals;
- Recognize achievements and Lessons Learnt;
- Instigate the Mindset;
- Inspire by actions!

Fear of Digital Darwinism

- Most executives (82%) worried of "Digital Darwinism," citing a fear of becoming obsolete (70%).
- The key challenge for many (61%) is coming up with radical and disruptive ideas.
- While 30% of executives agree that the most innovative companies create a new market that didn't previously exist, 58% say incremental improvements in existing products or services has contributed the most to their performance.

ROI on Collaboration is Increasing

- Executives increasingly report (77% versus 64% in 2014) increase in financial results from revenue and profit generated by collaboration.
- Collaboration contributed to the financial results of 80% of companies whose strategies are oriented toward breakthrough innovation.
- 68% executives are open to risk-sharing associated with innovation.

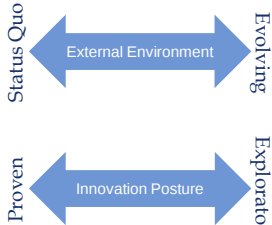
<http://www.gereports.com/innovation-barometer-2016/>



How do we transform a business from Engineering Solutions to a Technology Provider?

Develop Axis Descriptions to Capture Forces of Change

- What are the primary driving forces?
- What uncertainties are most influential?
- Which axes best characterize the change?
- How plausible are the scenarios that emerge from the axes?



Status Quo	External Environment		Evolving
Proven	Innovation Posture		Exploratory



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How do we transform a business from Engineering Solutions to a Technology Provider?

Survivalists
Politically Savvy
Deliberate
Persistent
Protective

Pioneers
Opportunistic
Expansive
Aggressive
Visionary

Landslards
Thrifty
Conservative
Reliable
Practical

Explorers
Financially Astute
Curious
Bold
Convincing

Webinars

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SOCIETY OF PETROLEUM ENGINEERS

A stack of papers with the text "How will technology innovation change the way energy is sourced, delivered and consumed?" written on the top sheet. In the bottom right corner, there is a logo for "Webinars" featuring a stylized Wi-Fi symbol and the word "Webinars" below it.

How can scenario planning prepare us for the future of the industry and the impact of Technology?

Webinars

Uncertainty is the New Certainty

Single-Point Forecast

Trends

Range of Uncertainties

Timing?

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How can scenario planning prepare us for the future of the industry and the impact of Technology?

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Disruptive Strategy

- Business;
- Partnership;
- Market;
- Product;

Sustaining/Maintaining Strategy

- Invest in your Team;
- Get involved with Customers;
- Build a lean mindset;
- Create to brand not to market

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How can scenario planning prepare us for the future of the industry and the impact of Technology?

Webinars

DO-ALONE RAD

OPEN COLLABORATION RAD

INTEGRATED RAD NETWORK

RAD RING

DO-ALONE RAD

OPEN COLLABORATION RAD

INTEGRATED RAD NETWORK

RAD RING

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How can scenario planning prepare us for the future of the industry and the impact of Technology?

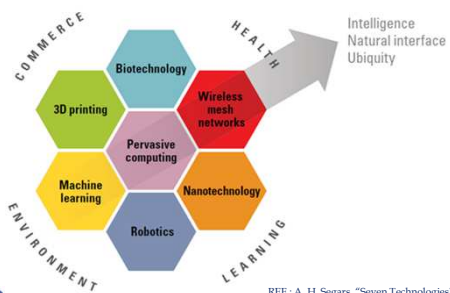


1. List all variables: Customers, New Players, Market, Teams, etc.
2. Set Who you will be: Follower, Maintainer, Disruptive, Hybrid, Global, Local, etc.
3. Define your main Strategy and then the Specific plan according to (1) and (2)
4. Use the right tool/team for each Technology to be developed
5. Set the metric for each group and measure
6. Take decisions fast and re-start using what was learned
7. Be sure your hierarchy is flat and aligned with the strategy
8. Promote innovation at your team understanding the risks
9. Create a self motivate environment, people must have the right profile
10. **Keep your eyes at the list of (1) and act changing (3), do not react!**



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The Rise of Super-Technologies



REF.: A. H. Segars, "Seven Technologies Remaking the World", MIT Sloan Management Review, March 2018.

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The Rise of Super-Technologies



Technology	What it is	Application
Pervasive Computing	The technology driving IoT, the engine of IoT	Enable companies to vault the barriers that once separated functions such design, manufacturing and selling;
Wireless Mesh Networks	Ad hoc loops of wireless connectivity in which only one device requires an internet connection	Drones, remote locations and critical operations which demand High-bandwidth, Dynamic, Wireless Smart Connectivity
Biotechnology	Technologically created and enhanced life-forms and Systems	Transform fossil fuels into cleaner sources of energy
3D Printing	Also referred to additive manufacturing	Rapid prototyping, new forms of design, testing, building and collaboration
Machine Learning	Augmented and Automated data analysis	Systems, process and predictive analytics can gain access to deeper insights and accelerate decisions
Nanotechnology	Engineered atoms and super-materials	Particles to decompose organic solvents, reduce amount of pollution at the manufacturing process, new coatings and materials
Robotics	Precise, Agile, Intelligent Mechanical systems	Design and install complex systems. Work at harsh environments



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Thank You!



“Great ideas alter the power balance in relationships. That’s why great ideas are initially resisted. Good ideas come with a heavy burden. Which is why so few people have them. So few people can handle it.”
 -Hugh Macleod



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