




# What are the Barriers to Adoption of Radical Innovation in Conservative Industries and How Can They Be Overcome by Technology Providers?

Diane Roessler Weinert   
Siren De, San Francisco, California, US

## Suggested Citation

Weinert, D.R. (2023). What Are the Barriers to Adoption of Radical Innovation in Conservative Industries and How Can They Be Overcome by Technology Providers? *European Journal of Theoretical and Applied Sciences*, 1(4), 1237-1247.  
DOI: [10.59324/ejtas.2023.1\(4\).113](https://doi.org/10.59324/ejtas.2023.1(4).113)

## Abstract:

The research explores the “petroleum industry” in the field of “oil and gas”. The goal is to convert industry “conservatism” into an industry standard that follows a consistent pattern of architecture, dominant design, and radical innovation, articulated and applies the assistance of technology providers and eliminate the biases and give the innovator the pertinent information that he/she needs to move forward with innovation adoption. The focus of the research was on cross-case examinations which included historical and new innovation. The method that was chosen is the qualitative and quantitative approach. The research led to the conclusion that the

main innovation barriers are regulation, perception, justified beliefs, uncertainties, financial, log size, security and privacy. The paper is focusing on volatility within the petroleum industry as the main barrier. Recommendations to these barriers are technological providers, structure and methodology. There is a gap where future research is recommended with the universities being able to assist with innovative ideas.

**Keywords:** *radical innovation, Sustainability, petroleum industry, volatility, oil and gas.*

## Introduction

The research question is "What are the barriers to adoption of radical innovation in the conservative petroleum industry"?

The differences between “The American Exceptionalism” and “Jeremiad against Consumerism” is an example of two different cultures (Luedicke, Thompson & Geisler, 2010). You have the Jeremiad against consumerism preaching that too many resources are being used while the American Exceptionalism is explaining if there are issues then we should drill for more oil (Luedicke, Thompson & Geisler, 2010). This is what is taking place with the environmentalists and the developers. This Literature Review focuses on radical innovation adoption. Today

that would be the pipeline. This is no easy adoption when there is one the proposal is attached to major delays and destruction. The major benefit to the pipeline is that if there is a leak which they are estimating at low risk then the clean up is less than in the ocean. With this said now let's revisit the American Exceptionalism vs Jeremiad against Consumerism. Agriculture doesn't want their land destroyed the shipping industry doesn't want to take a hit the marine world wants a clean ocean.

The research explores the “petroleum industry” in the field of “oil and gas”. The problem of innovators to gain innovation adoption in conservative industries that rather opt for incremental innovation to reduce the risk



inherent in radical innovation. The method that I have chosen is the qualitative and quantitative approach. The approach used is a straight logical way. Radical innovation changes an entire process. Radical innovation creates shifts within the industry. They represent clear departures from existing practice.

The research led to the conclusion that the main innovation barriers are regulation, perception, justified beliefs, uncertainties, financial, log size, security and privacy. The paper is focusing on volatility within the petroleum industry as the main barrier. Recommendations to these barriers are technological providers, structure and methodology. There is a gap where future research is recommended with the universities being able to assist with innovative ideas.

The goal is to convert industry “*conservatism*” into an industry standard that follows a consistent pattern of architecture, dominant design, and radical innovation, articulated and applies the assistance of technology providers and eliminate the biases and give the innovator the pertinent information that he/she needs to move forward with innovation adoption. The focus of the research was on cross-case examinations which included historical and new innovation. Throughout the text, the terms “petroleum” and “oil and gas” are used interchangeably and should be read in this context (Claws, 2016).

The Forest Plot was designed to show the prevalence of the measures to focus in on key barriers. Database building is used as a validation process. Grounded theory is used with keeping an open mind to new theories by constant comparison and specifying relationships to develop categories. Case studies were selected using key phrases, “barriers to adoption of innovation”, “oil spills prevention” and “oil production are explored”. The innovation that has been researched is specialized and in the petroleum industry in order to eliminate the variance of factors associated with adoption. Innovation buyers are looking for economic friendly innovation. The search was completed by using the key phrases “innovation adoption”, “resistance to innovation”, “innovation production”, conservative industries”,

innovation adoption in offshore oil”. The main journals that were researched was the Research Policy (A), Journal of Product Innovation Management (A), International Journal of Technology Management (B), and MIT Sloan Management Review (B).

### Scholarly Statement

The research this far has led me to improve my network and configured my system to an ambient system. The structure and organization are more efficient. Now the categories are more to my needs “oil production” “financial “etc. The research has been phenomenal as it led to the gaps that were not directly announced. In other words there is a lot of information on innovation adoption; consequently, it is not defined. IUM guided me to get to the root of it all with methodology. One of the business deficiencies is raising capital. There is no doubt that there is an astronomical amount of potential.

### Terminology

Radical innovation requires more knowledge whereas incremental innovation requires a low degree of knowledge. Larger firms are more equipped with the specialists needed for innovation adoption. The results show that the strengths of innovation adoption are log size .74, complexity .71, depth of knowledge .77, whereas managerial attitudes towards change .07, exposure to external information .08 and centralization at .14.

### The Management Problem and its Importance

“Technology Providers face challenges to promote the adoption of radical innovation in conservative industries”.

The reported overall currency of measures are 38% success rate of new products 11% success rate of firms entered into an established market (Christensen, Surez & Utterback, 1998). As Saudi Arabia’s energy minister, Khalid Al- Falih, said at the G20 Ministerial meeting in Japan, the world needs more investment into research and development on reducing the impact of energy use (Sertin, 2019). In the case study shows how radical innovation may have saved Ice

Harvesting if they were the ones to introduce it. Instead they allowed their competitor to change the market. Marcelo Magalhaes, assisted to break up a monopoly then the oil price dropped, he then made the decision to enroll in a University. Fialka (2019), wants to put a plane engine in a car while others want to put out automation. "Then you develop new technology for the automotive industry" (Fialka, 2015). "Which might someday switch over to electric engines" (Fialka, 2015).

Managers need a way of coping with radical innovation entering into the market as the changeover revolutionizes the industry. Christensen, explains companies fail to recognize disruptive innovation or delve in risky opportunities as they are focused on existing customers (Research Technology Management, 2010).

Organizational *ambidexterity* is listed among up-to-date concepts recommended for managers to cope with turbulence and multidimensionality of the business environment (Lis et al., 2019). The idea of combing both evolutionary and revolutionary organizational changes seem to be very attractive but challenging to implement (Lis et al., 2019).

### The research problem

"What are the barriers to adoption of radical innovation in the conservative petroleum industry?"

Historical methods are used today which decreases risk in introducing radical innovation when implemented. Many Business to Business (B2B) opt for incremental innovation vs radical innovation. Most economies rely currently on products from crude oil, and inadequate oil resources can jeopardize a countries development and elevate living costs (Bachmann, Johnson & Edyvean, 2012). The Literature Review research analyzes, interprets and opposes the literature by authors Ann Hagedorn (2014), Eric Von Von Hippel (1998), Abernathy & Utterback (1978), Christensen (1998) and Millier (1994). Today innovation is the buzz; however, innovation was released in estimated 1974. As in this example," The current

program traces its origins to the Automotive Energy Efficiency program which was started in 1974 to evaluate the capability of the automotive industry to improve the fuel economy of their production vehicles, and to assess the energy, safety, economic, and environmental effects" (Boyd, 1978). The literature review focuses on the academic and technology aspects of innovation. There are reasons for conservatism and much of it relates to risk. Automation vs Oil and gas or can they integrate? Bill Gates has a prediction Robot Dexterity, Robotics and automation tools have been popping up in factories across the world, but still operate in carefully controlled environments because they are "clumsy and inflexible" (Liberto, 2019). What happens when the innovation gets into the wrong hands such as in the drone attack on two major Saudi Oil Installations (Hubbard, Karasz & Reed, 2019)? Can one get around the violence that radical innovation can lead to as armies are in some cases delivering? The government contract is feasible income; consequently, it is hard to trace the transaction (Hagedorn, 2014). The intention of the research for the Literature Review is to have taken the best reliable articles and summarize the information and then evaluate case studies and compare facts for reliability. There have been no stones left unturned the research has been exhausted from different well- renowned authors. The reason for undertaking the study is that the Literature Review will lead the economic revolution and be a paper that anyone making a decision involving innovation will want to read. The research in the Literature Review consisted of over 30 articles and 5 books. It is not enough for a company just to innovate in order to be successful on the norm the research will show that a government alliance or private sector will need to be involved. In some cases there is Sovereign Wealth.

There is the ideology of "American Exceptionalism "and "Jeremiad against Consumerism" (Luedicke, Thompson & Giesler, 2010). Hummer enthusiasts are moral protagonists' defenders of American values " , whereas, Hummer Antagonists as Moral Protagonists which are defenders of the

collective goods the socially irresponsible consumers (Luedicke, Thompson & Giesler, 2010).

Database building is used as a validation process. Grounded theory is used with keeping an open mind to new theories by constant comparison and specifying relationships to develop categories. The innovation that has been researched is specialized and in a few industries in order to eliminate the variance of factors associated with adoption. It gives more value on certain types of “industries” and specialized “innovation”. The Literature Review proposal explains that it is not just the design of the innovation that gains adoption there is psychology and mythological aspect along with other dependent variables.

Today there is more of a demand for sustainability. Environmental impacts, less pollution, supply chain related Co2 Emissions, landscape destruction, and impacts on local ecosystems and water resources (IEA, 2019).

The research led to a few of the most relevant barriers:

- Conservative industries/companies;
- Do not care about sustainability;
- Do not cooperate with external knowledge providers (such as universities) to create innovative solutions;
- Do not develop unconventional innovation;
- Are highly regulated;
- Uncertainty of the development of regulation.

### Goals of Research

There are different behaviors within the conservative industry. The purpose of the research is to eliminate the biases expand knowledge, and give the innovator pertinent information that he/she needs to move forward with innovation adoption. There was cognitive interest that lead to exploration of different types of historical innovation and cross-case comparisons. Ontology was used to find the phenomena. The articles contribution is in advocating and describing the possibilities of

researchers replacing “postulate of commensurate complexity” it is impossible for a theory of social behavior to be simultaneously general, accurate and simple and as a result organizational theorists inevitably have to make tradeoffs in their theory development with a new postulate of disproportionate achievement (Woodside, 2009). This new postulate proposes the possibilities and advocates the building and testing of useful process models that achieve all three principle research objectives (Woodside, 2009). This article describes how behavioral science research methods that management and marketing scholars apply in studying processes involving decisions and organizational outcomes relate to three principle research objectives, fulfilling generality findings, achieving accuracy of process, actions and outcomes, and capturing complicity of nuances and conditions (Woodside, 2009), In an article entitled “Criteria against ourselves” Bochner (2000) argues that traditional empiricist criteria are helpful and even “silly” when applied to new and alternative ethnographies (Tracy, 2010).

The goal is to convert industry “conservatism” into an industry standard. The research identifies several gaps and then eliminates per discovery.

The gap that I have discovered and would like to research more is development in the “oil and gas” field. This paper compares the barriers of radical innovation and sorts through the ones that can be falsified without biases. Radical innovation comes in invisible and then becomes the industry standard when successful. Radical innovation revolutionizes the industry (Dewar & Dutton, 1986). There is no guarantee in the launch phase that radical innovation will be successful. When the innovation is specialized there will be a high demand for engineers. When there is a need for more engineers the adoption rate will be easier for a larger firm as they have more resources. Communication frequency plays a large role in a successful launch of radical innovation. The more familiar and educated everyone is the higher the ratio of success. The Literature Review is to propose to you that more research is needed in “conservative industries” “radical innovation, and “technology” “providers”.

## Methods

The research methods are descriptive, quantitative, qualitative, narrative, realist review, and the main source of information was from

primary and secondary literature. Case illustrations were used to show the effects of radical innovation with historical innovation. A systematic review and meta-analysis were incorporated as the analysis of the literature researched.

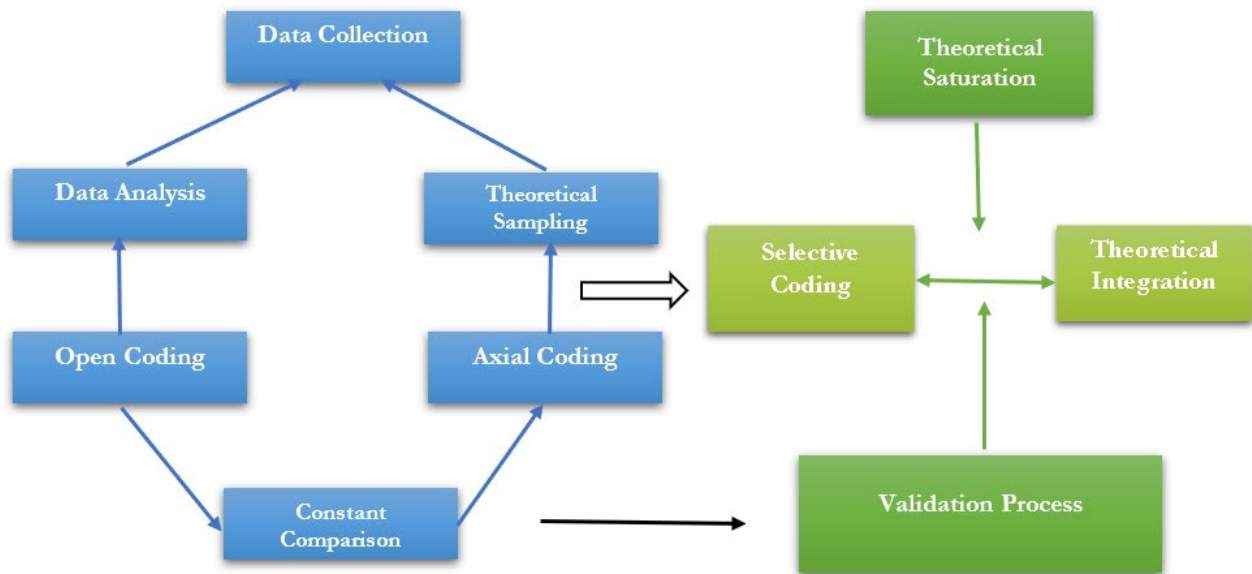


Figure 1. The mix of methods

Table 1. Components of Engaged Scholarship Research

Component	Definition
Journal	The target journal defines the audience for the research and the conversation in which the work participates.
Title	The title expresses the essence of the research design, with emphasis on C.
P	The problem setting represents people's concerns in a real-world problematic situation.
A	The area of concern represents somebody of knowledge in the literature that relates to P.
F	The conceptual framing helps structure collection and analysis of data from P to answer RQ; FA draws on concepts from A., whereas F1 draws on concepts independent of A.
M	The method details the approach to empirical inquiry, specifically to data collection and analysis.
RQ	The research question relates to P, opens for research into A, and helps ensure the research design is coherent and consistent.
C	Contributions influence P and A, and possibly also F and M.

Source: Mathiassen, 2017

## Literature Review

The contributions of the literature Review are to showcase the historical and current strategies of innovation. Conservative, public and private companies are compared in the "oil and gas", automotive, aircraft, Ice Harvesting industry, and showcases illustrations.

The Literature Review presents the top innovations of today and historically. It presents to the reader what to expect for the future and informs of the gaps. The research allows for managers to have the most important information available to them as this will allow for a much higher success rate.

Theoretical research: “History of Economic Analysis”, Schumpeter rejected the paradigm of individualism- utilitarianism (and personal liberty). He did not seriously consider the paradigm of uncertainty (Schumpeter, 2006). Schumpeter sought more for sophistication and took the less conventional approach (Schumpeter, 2006). Schumpeter’s understanding was that one needs to understand economic phenomena, after abstracting what one understood from ideological preferences, depends in large part on the epistemological methods one employs, but that each of these methods has its own historical –sociological experience (Schumpeter, 2006).

Eric Von Von Hippel “The sources of innovation”, Transferring process equipment innovation from user –innovators to equipment manufacturing firms (Von Hippel, 1998). Eric Von Von Hippel argued that variation in the sources of innovation are caused to a significant degree by variations in potential innovators’ expectations of innovation- related profits, two managerial useful things be possible, maximizing the economy in production (Von Hippel, 1998).

Qualitative research: cite main authors / contributions (books, articles, other) here. e.g. Christensen. Suarez & Utterback, (1998). A couple of sentences on each is enough.

The world philosophers explain a capitalist society. Robert L. Heilbroner (1999) creates a call to action. By the year 2030, every worker should have at his elbow enough machinery to make him Superman in terms of his grandfather who lived in 1930 (Heilbroner, 1999).

Patrick Baert (2005) explains philosophy of the social sciences: towards pragmatism. Included are the controversial theories and methods of Emile Durkheim's Naturalism, Max Weber's Interpretive Method, Karl Popper's Falsification, critical realism, critical theory, Richard Rorty and Pragmatism and a Pragmatism philosophy of the Social Sciences (Baert, 2005).

## Approaches

Grounded theory was used and case studies were explored. There was cognitive interest that lead

to exploration of different types of historical innovation. Ontology was used to find the phenomena. Ontology was reached when the measures were reported. By using the ontology approach the unnecessary was eliminated and the relevant data was listed. Epistemological assumptions were used to go beyond processes and recognize that culture and perception play a large role in innovation adoption. Inductive is used as the principles are not being changed. Conservative industries verses non-conservative industries are opposed. The barriers of conservative industries verses non-conservative industries are different. The main methods implemented are descriptive, quantitative, qualitative, narrative and realist review methods.

Netnography was utilized to study the culture and perception in order to achieve innovation adoption (Belk & Kozientz, 2017). A photoelicitation technique was used in selecting images to provide a richer understanding for the culture (Heisley & Levy, 1991). A main focus incorporated was the environmental concerns with radical innovation. There are different perceptions as with Jermanaid against consumerism (Luedicke, Thompson & Geisler, 2010). One says your “depleting resources while the opposition says “drill more” (Luedicke, Thompson & Geisler, 2010).

## Theory Driven

Case selection is traced back to the relationships and logics between prior theoretical concepts (Fletcher et al., 2017).

Case selection is traced back to a prior theoretical model/framework (Fletcher et al., 2017).

Case selection is traced back to theoretical proposition upfront (Fletcher et al., 2017).

Case selection is based on a theoretical sampling framework (Fletcher et al., 2017).

## Phenomenon Driven

Case selection represents the focal phenomenon (Fletcher et al., 2017).

Case selection captures variations in a phenomenon without predetermined theoretical assumptions (Fletcher et al., 2017).

Case selection is a process of casing which is dynamic (Fletcher et al., 2017).

Coherent pathways could promote methodological clarity and alignment and hopefully a wider acceptance of CS (Case Selection) research (Fletcher et al., 2017).

## Results and Discussion

With the steady increase in demand for oil, the prospective alternatives are exploration of new sources of energy or utilization of enhanced oil recovery (EOR) techniques in poor performing and depleted oil wells (Bachmann, Johnson, Edyvean & 2012). Innovativeness was determined through expert evaluation of information technology innovativeness over time, similar findings have led the general acceptance of the notion that, before a business can adopt and use a technology, members of the business unit must become knowledgeable for

the technology and be able to propose ideas for its use (Lind & Zmud, 1991).

Many countries are trying to build their new maps and become more domestic. U.S. crude oil export volumes have increased to an average of 2.8 million barrels per day (b/d) in the first seven months of 2019, the number of destinations (which includes countries, territories, autonomous region and other administrative regions, that receive U.S. export destinations coincides with the late 2015 lifting of restrictions on exporting domestic crude oil (Fuels Market News, 2019). Export terminals have been expanded to accommodate greater crude oil tankers, and larger cargo sizes (Fuels Market News, 2019).

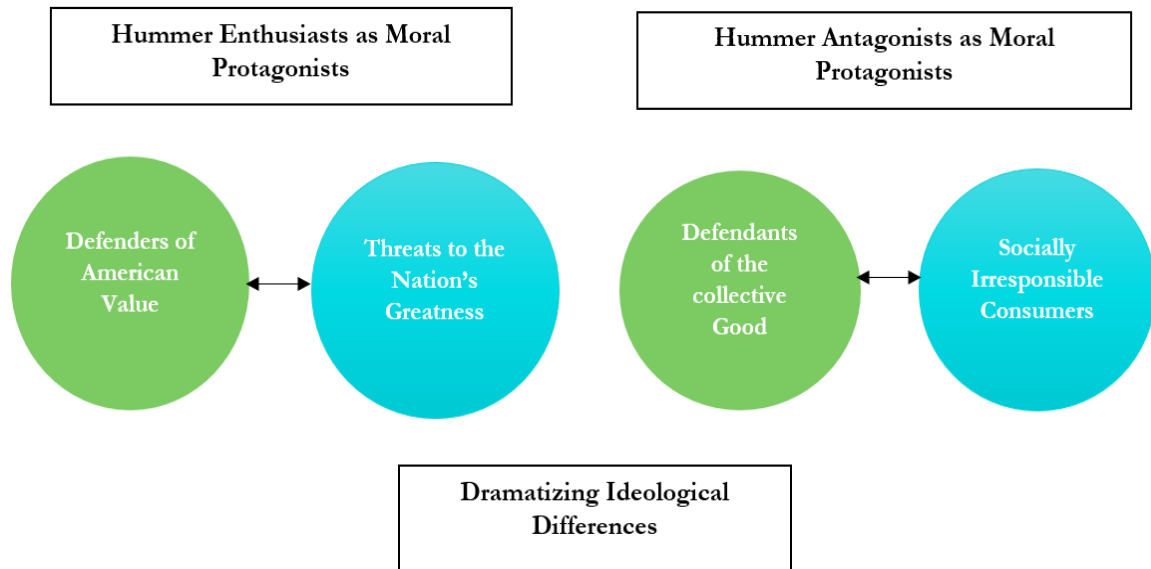
“The Silk Road Economic Belt “that connects China with Europe Via Central Asia on the Middle East, including railways, bridges, overland trade corridors, power transmission lines and data- transfer links (Lehmann, Hauor & Onlick, 2018).



Figure 2. China's Belt and Road Initiative

Source: Wanandi, 2019

## Problematic Assumptions



**Figure 3. Consumption-Mediated Enactments of Morality Play Case Illustrations**

Source: Luedicke, Thompson & Giesler, 2010

### Research Question(s)

Are all service jobs going to be eliminated as automation advances?

What are the organization's capabilities in searching for, planning, organizing, cultivating and experimenting in radical innovation (Chang et al., 2012)?

How do these types of organizational capabilities influence the corporate radical innovation performance (Chang et al., 2012)?

How do we build a pipeline that delivers a steady stream of breakthrough innovations (Research Technology Management, 2010).

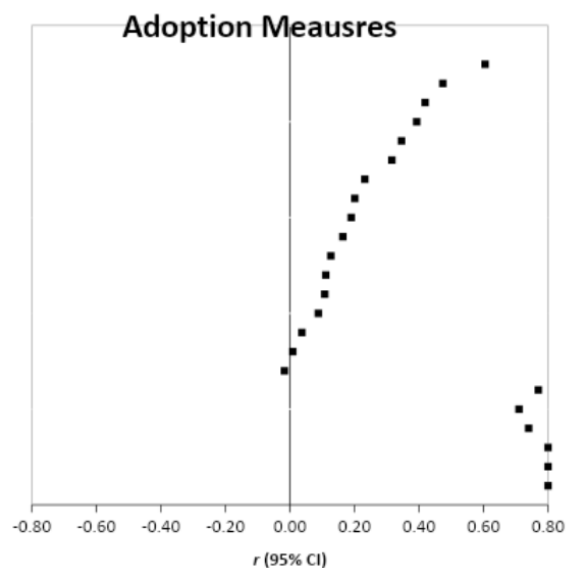
Do we benefit from manufacturing it (Von Hippel, 1998)?

Do we benefit from supplying the components or material necessary to build or use the innovation (Von Hippel, 1998)?

Is there a way to break out of this highly capitalized highly controlled, and generously uninnovative mode of production (Utterback, 1994)?

Would a patent succeed without a government partnership or private sector support?

### Measures



**Figure 4. Foster Plot with Prevalence Measured**

Source: Fialka, 2019



This is a complex tasks, encompassing regulatory interventions, R&D Incentives, Economic Incentives, and Institutional Incentives for both the buyers and producers of automobiles (Boyd, 1978). Federal Policies for inducing the development and adoption of innovative automobile technology are examined using welfare economics framework (Boyd, 1978). Socially efficient technology is defined, and criteria are identified for evaluating public policies; these, include (a) feasibility and efficiency, (b) mechanism for tradeoffs, (c) information requirements, (d) incentives for information generation, (e) incentives for optimizing technology, and (f) effects on uncertainty (Boyd, 1978). Policies which place greater reliance on market forces, product information, and fiscal incentives can overcome many of the barriers to innovation which confront performance standards (Boyd, 1978).

Uncertainties faced by manufacturers include costs of new technology, consumer acceptance, and the nature and magnitude of future regulations (Boyd, 1978).

### Robot Dexterity

Robotics and automation tools have been popping up in factories across the world, but still operate in carefully controlled environments because they are "clumsy and inflexible" (Liberto, 2019).

Given the industry focus of transformation with visions such as unmanned platforms and autonomous operations the time is right to jump start the adoption of robotics in a wider scale, thereby the economics of scale would prove to make the case for wider adoption (Upadhy, 2019). The global robotics market, which forecasts the expected market growth at a rate of CAGR of 24.52% over the forecast period of 2018-2023 (Upadhy, 2019).

A hindrance to success of a firm is hostile rivals. This is a no win situation. Sometimes the attack is invisible. One can only ponder could it be oil vs automation? Is this some of the issue? What brings on these attacks? Drone attacks claimed by Yemen's Houthi rebels struck two key oil installations inside Saudi Arabia on Saturday,

damaging facilities that process the vast majority of the country's crude output and raising the risk of a disruption in world oil supplies (Hubbard, Karasz & Reed, 2019).

### Conclusion

The present research develops and validates, perceived usefulness and perceived ease of use, which are hypothesized to be fundamental determinants of user acceptance (Davis, 1989). The measures were refined and streamlined, resulting in two six-item scales with reliabilities of .98 for usefulness and .94 for ease of use (Davis, 1989). There is a resistance to the adoption of innovation when the innovation is complex and the user cannot identify with the available system (Davis, 1989). Perceived usefulness and perceived ease of use are theorized to be fundamental determinants of system use (Davis, 1989). People are more apt to adopt when they feel there will be an improvement in job performance (Davis, 1989).

### References

- Abernathy, J.W. & Utterback, M.J. (1978). Patterns of Industrial Innovation. *Reprinted for Technology Review*, 80(7), 40-47.
- Bachmann, T.R., Johnson. C.A, & Edyvean, J.G.R. (2012). Biotechnology in the petroleum industry: An overview. *International Biodeterioration & Biodegradation*, 86(C), 225-237.  
<https://doi.org/10.1016/j.ibiod.2013.09.011>
- Baert, P. (2005). *Philosophy of the Social Sciences: Towards Pragmatism*. Malden, MA: Polity
- Belk, R., & Kozinetz, R. (2017). Videography and netnography. In *Formative Research in Social Marketing* (pp. 265-279). Singapore: Springer.
- Bochner, A. P. (2000). Criteria Against Ourselves. *Qualitative Inquiry*, 6(2), 266–272. <https://doi.org/10.1177/10778004000060209>

- Boyd, H. (1978). Inducing the Development and Adoption of Socially Efficient Automotive Technology. Retrieved from <https://rosap.ntl.bts.gov/view/dot/10421>
- Chang, Y.-C., Chang, H.-T., Chi, H.-R., Chen, M.-H. & Deng, L.-L. (2012). How do established firms improve radical innovation performance? The organizational capabilities view. *Technovation*, 32, 441–451. <https://doi.org/10.1016/j.technovation.2012.03.001>
- Christensen, C. M., Suárez, F. F., & Utterback, J. M. (1998). Strategies for Survival in Fast-Changing Industries. *Management Science*, 44(12), S207–S220.
- Clews, R.J. (2016). *Project Finance for the international petroleum industry*. Elsevier.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Dewar, R. D., & Dutton, J. E. (1986). The Adoption of Radical and Incremental Innovations: An Empirical Analysis. *Management Science*, 32(11), 1422–1433.
- Fialka, J. (2019). How do you put a Plane Engine in a Car? Scientific American E&E News Automotive. Retrieved from <https://www.scientificamerican.com/article/how-do-you-put-a-plane-engine-in-a-car/>
- Fletcher, M., Zhao, Y., Plakoyiannaki, E., & Buck, T. (2018). Three Pathways to Case Selection in International Business: A Twenty-Year Review, Analysis and Synthesis. *International Business Review*, 27(4), 755-766. <https://doi.org/10.1016/j.ibusrev.2017.12.004>
- Fuels Market News. (2019). EIA: The United States Now Exports Crude Oil to More Destinations than it Imports from. Retrieved from <https://fuelsmarketnews.com/the-united-states-now-exports-crude-oil-to-more-destinations-than-it-imports-from/>
- Hagedorn, A. (2014). *The invisible Soldiers: How America Outsourced our Security*. USA: Simon & Schuster.
- Heilbroner, R.L. (1999). *The Worldly Philosophers: The Lives, Times And Ideas Of The Great Economic Thinkers*, Seventh Edition. Touchstone
- Heisley, D. D., & Levy, S. J. (1991). Autodriving: A Photoelicitation Technique. *Journal of Consumer Research*, 18(3), 257–272. <https://doi.org/10.1086/209258>
- Hubbard, B., Karasz, P. & Reed, S. (2019). Two major Saudi Oil Installations hit by drone Strike, and US blames Iran. Retrieved from <https://www.nytimes.com/2019/09/14/world/middleeast/saudi-arabia-refineries-drone-attack.html>
- IEA. (2019). Global EV Outlook 2019: Scaling up the transition to electric mobility. Retrieved from <https://www.iea.org/reports/global-ev-outlook-2019>
- Kreuzer, M. (2019). *Applied Qualitative Research*. International University of Monaco.
- Lehmann, J.P., Haour, G. & Orlick, A.L. (2018), *Eurasia in the New Global Disorder: How Should Businesses Navigate the Changing Geopolitical Landscape?* International Institute for Management Development Retrieved from <https://imd.widen.net/view/pdf/6ht8g3mhzh/iai001.18-eurasia-in-the-new-global-disorder-revised-20.02.18.pdf>
- Liberto. D. (2019). Bill Gates names 10 breakthrough technologies of 2019. Retrieved from <https://www.weforum.org/agenda/2019/03/bill-gates-top-10-breakthrough-technologies-of-2019/>
- Lind, M.R. & Zmud, R.W. (1991) The Influence of a Convergence in Understanding between Technology Providers and Users on Information Technology Innovativeness. *Organization Science*, 2, 195-217. <http://dx.doi.org/10.1287/orsc.2.2.195>

- Lis, A., Jozefowicz, B., Tomanek, M., & Gulak, P. (2018). The Concept of the Ambidextrous Organization: Systematic Literature Review. *International Journal of Contemporary Management*, 17, 77-97. <https://doi.org/10.4467/24498939IJCM.18.005.8384>
- Luedicke, M. K., Thompson, C. J., Giesler, M., & John Deighton served as editor and Eric Arnould served as associate editor for this article. (2010). Consumer Identity Work as Moral Protagonism: How Myth and Ideology Animate a Brand-Mediated Moral Conflict. *Journal of Consumer Research*, 36(6), 1016–1032. <https://doi.org/10.1086/644761>
- Mathiassen, L. (2017). Designing Engaged Scholarship: From Real-World Problems to Research Publications. *Engaged Management Review*, 1(1), 17-28.
- Research Technology Management. (2010). Changing the Game; Understanding breakthrough innovation. Retrieved from <https://www.thefreelibrary.com/Changing+the+game%3A+understanding+breakthrough+innovation.-a0241277730>
- Schumpeter, J.A. (1954). *History of Economic Analysis*. New York: Oxford University Press.
- Sertin, C. (2019). Saudi Aramco and ADNOC boost global oil and gas contracts activity in Q3. Retrieved from <https://www.globaldata.com/media/oil-gas/saudi-aramco-and-adnoc-boosts-global-oil-and-gas-contracts-activity-in-q3-2019/>
- Tracy, S. J. (2010). Qualitative Quality: Eight “Big-Tent” Criteria for Excellent Qualitative Research. *Qualitative Inquiry*, 16(10), 837–851. <https://doi.org/10.1177/1077800410383121>
- U.S. Energy Information Administration. (2017). Annual Energy Outlook 2017 with projections to 2050. Retrieved from <http://large.stanford.edu/courses/2017/ph241/grace1/docs/0383-2017.pdf>
- Upadhya, V (2019). Robotics Adoption in Oil and Gas Resource Industry. Retrieved from <https://appirio.com/robotics-adoption-in-oil-and-gas-resources-industry>
- Utterback, J. (1994). *Mastering the Dynamics of Innovation; How companies can seize opportunities in the face of technological change*. Boston Massachusetts: Harvard Business Press.
- Utterback, M.J. & Suarez, F.F. (1991). *Innovation, competition, and industry structure*. Sloan School of Management. MIT Cambridge, MA, USA
- Von Hippel, E. (1988). *The Sources of Innovation*. Oxford University Press.
- Wanandi, J. (2019). Insight: Seeking global cooperation through Belt and Road Initiative. Retrieved from <https://www.thejakartapost.com/academia/2019/05/13/insight-seeking-global-cooperation-through-belt-and-road-initiative.html>
- Woodside, A.G. (2010). Bridging the Chasm between Survey and Case Study Research: Research Methods for Achieving Generalization, Accuracy, and Complexity. *Industrial Marketing Management*, 39(1), 64-75. <http://dx.doi.org/10.1016/j.indmarman.2009.03.017>