

## Review Article

# “What are the Barriers to Adoption of Radical Innovation in Conservative Industries and How can They be Overcome by Technology Providers”?

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## 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. P. 1). 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. P. 1). 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 proposal that 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 cleanup 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 (Duchesneau, Cohn, Dewar, Dutto, 1986, P.1422, 1423).

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 focuses 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, 2). Throughout the text, the terms "petroleum" and "oil and gas" are used interchangeably and should be read in this context (Claws, 2016, 2).

The Forest Plot was designed to show the prevalence of measures to focus on key barriers. The dynamics of radical innovation is illustrated in the case studies Appendix A- G. 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 is explored". The innovation that has been researched is specialized 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 were 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.

**Keywords:** *Sustainability, Innovation, R & D, Investor Relations, eB2B, B2B (Reliance, 2019, p. 1). Radical, Adoption, Economic, Hypothesis, Grounded Theory, Privatization, and Ambidexterity. Case Illustrations,*

*Generality, Accuracy, Complexity and Process (Woodside, 2009p.1). B2B (Business to Business, Radical, Conservative, Ontology, Phenomena, Grounded Theory, Measure, Government Alliances, Adoption, Cloud, : Lot, M2M, Ambient Intelligence, and Artificial Intelligence, Barge, Boxcar, Claim, Coastal shipping, commodity, Free Trade Zone, Private Carrier, global emissions, Oil and gas pollution, case study research, generality, accuracy, complexity, process, Qualitative Research, Case Study, Research Methodology, Case Study, International Business (Fletcher, Zhao, Plakoyiannaki, Buck,2017. P. 6).*

## **Terminology**

Radical innovation requires more knowledge whereas incremental innovation requires a low degree of knowledge (Dewer, Dutton, 2016. P.1422). Larger firms are more equipped with the specialists needed for innovation adoption (Dewer, Dutton, 2016.P.1422). 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 (Dewer, Dutton, 2016, P.1422).

## **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 is 38% success rate of new products 11% success rate of firms entered into an established market (Christensen, Surez, Utterback, 1998, S210). 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, p.1). In the case study, Appendix A, 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. Appendix B shows how not predicting future outcomes can have an enormous effect on decision making and with technology provider’s education can assist. Marcelo Magalhaes, assisted to break up a monopoly then the oil price dropped, he then made the decision to enroll in a University (IMD, 2015.p.1). Appendix C Fialka, 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, 2015p.1). “Which might someday switch over to electric engines” (Fialka, 2015.p.1).

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. P. 68).

Organizational ambidexterity is listed among up- to-date concepts recommended for managers to cope with turbulence and multidimensionality of the business environment (Lis,Tomanek,Jozefowicz,Gulak, 2018, P.1). The idea of combing both evolutionary and revolutionary organizational changes seem to be very attractive but challenging to implement (Lis, Jozefowicz, Tomanek, Gulak, p.201).

## **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 country’s development and elevate living

costs (Bachmann, Johnson, Edyvean, 2012, p. 225). The Literature Review research analyzes, interprets and opposes the literature by authors Ann Hagedorn, Shumpeter, Geoffrey A. Moore, Eric Von Hippel, Utterback, Abernathy, Christensen and Millier. 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 p.5). The literature review focuses on the academic and technological 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.p.1). What happens when the innovation gets into the wrong hands such as in the drone attack on two major Saudi Oil Installations (Hubbard, Karasz, 2091, p.1)? Can one get around the violence that radical innovation can lead to as armies are in some cases delivering? Government contracts are feasible income; consequently, it is hard to trace the transaction (Hagedorn, 2014. Location 219). 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 and 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. P.1). 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. P.1).

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 to 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. p.1).

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 / Cognitive interest**

There are different behaviors within the conservative industry. The purpose of the research is to eliminate biases, expand knowledge and give the innovator pertinent information that he/she needs to move forward with innovation adoption. There was cognitive interest that led to exploration of different types of historical innovation and cross-case comparisons. Ontology was used to find phenomena. The articles contribution is in advocating and describing the possibilities of researchers replacing Throngatesn (1976) "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 G.A., 2009, p.64). This new postulate proposes the possibilities and advocates the building and testing of useful process models that achieve all three principal research objectives (Woodside G.A., 2009, p.64). 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 G.A., 2009,p.64 ), In an article entitled "criteria against ourselves " Bochner (2000) argues that traditional empiricist criteria are helpful and even "silly" (2000, p.268) when applied to new and alternative ethnographies (Tracy, 2010, p.838).

### **Literature review**

Streams of literature (goals, approaches, findings, knowledge gaps)

#### **Goal of the research**

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 becomes invisible and then becomes the industry standard when successful. Radical innovation revolutionizes the industry (Dewar, Dutton, 1986. p. 1424). 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 proposes to you that more research is needed in "conservative industries" "radical innovation, and "technology" "providers".

#### **Approaches**

Grounded theory was used, and case studies were explored. There was cognitive interest that led to exploration of different types of historical innovation. Ontology was used to find phenomena. The 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, Koziencz 2017, p. 272). A photoelicitation technique was used in selecting images to provide a richer understanding for the culture (Heisley,Levy, 1991. P.258). A main focus incorporated was the environmental concerns with radical innovation. There are different perceptions as with Jermanaid against consumerism (Luedicke, Thompson, Geisler, 2010, p. 1029. One says your "depleting resources while the opposition says, "drill more" (Luedicke, Thompson, Geisler, 2010, p. 1029).

### **Theory Driven**

Case selection is traced back to the relationships and logics between prior theoretical concepts (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

Case selection is traced back to a prior theoretical model/framework (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

Case selection is traced back to theoretical proposition upfront (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

Case selection is based on a theoretical sampling framework (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

### **Phenomenon driven**

Case selection represents the focal phenomenon (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

Case selection captures variations in a phenomenon without predetermined theoretical assumptions (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

Case selection is a process of casing which is dynamic (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

Coherent pathways could promote methodological clarity and alignment and hopefully a wider acceptance of CS (Case Selection) research (Fletcher, Zhao, Plakoyiannaki, Buck,2017, p.6).

### **Findings**

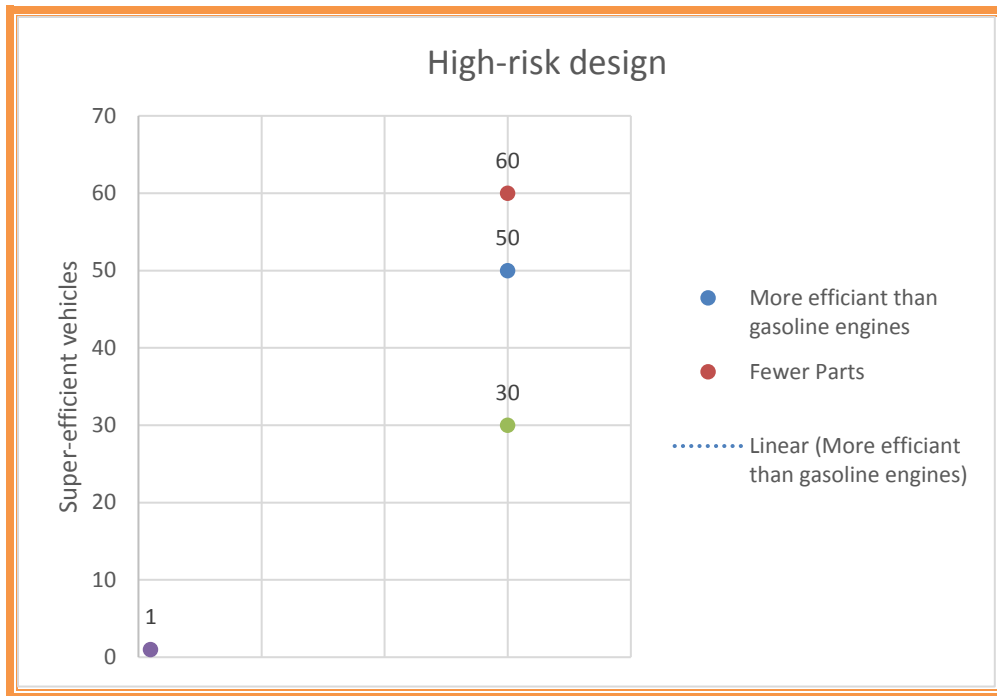
With the steady increase in demand for oil, the prospective alternatives are exploration of new sources of energy or utilization of enhanced oil recovery (EOR) techniques in poor performing and depleted oil wells (Bachmann, Johnson, Edyvean, 2012, p. 226). Innovativeness was determined through expert 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, p.197).

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 (EIA, 2019. p.1). Export terminals have been expanded to accommodate greater crude oil tankers, and larger cargo sizes (EIA, 2019. p.1).

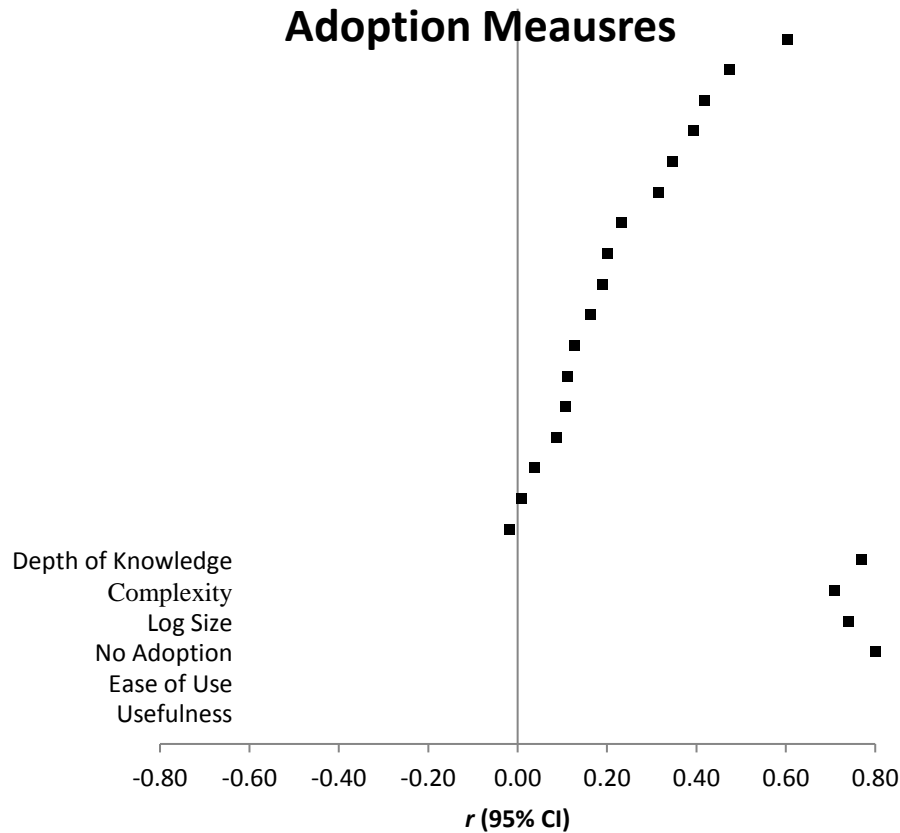
"The Silk Road Economic Belt "that connects China with Europe Via Central Asia on the Middle East, including railways, bridges, overland trade corridors, power transmission lines and data- transfer links (Lehmann, Haur, Onlick, 2018, p.1). When you look to 1978 when patents were being looked into for innovation upgrades you will see that a large market is of the government (Boyd, 1978 p.5). ARPA-E's projects have found \$2.9 billion in private-sector funding and developed ideas that resulted in 350 new U.S. patents (Fialka, 2019. P.1). Companies are building alliances and the logistic industry will continue to consolidate (Sedat, Saka, Forbes Technology, 2019, p.1). "This is about low carbon dioxide and low emissions engines" explained David Crompton, president and CEO of Achates, at an ARPA-E "Summit meeting" of experts and investors here this week. Fialka, 2019. P.1). The goal is to reduce traffic congestion (Fialka, 2019. P.1). He worries that other looming scientific developments, such as autonomous vehicles, might tempt drivers to drive their cars to events and then instruct them to drift driverless on the streets rather than paying parking fees (Fialka, 2019. P.1).

### Measures

**Table 1:** Fialka, 2019.p.1).



Foster plot with prevalence measured.



Davis, D, F,1989, p.1	Usefulness	1	0.98
Davis, D, F,1989, p.1	Ease of Use	2	0.94
Surinach, Autant-Bernard, Massard, Moreno 2009, p.85	No Adoption	3	0.80
Dewer, Dutton, 1986, p.1428	Log Size	4	0.74
Dewer, Dutton, 1986, p.1428	Complexity	5	0.71
Dewer, Dutton, 1986, p.1428	Depth of Knowledge	6	0.77

This is a complex task, encompassing regulatory interventions, R&D Incentives, Economic Incentives, and Institutional Incentives for both the buyers and producers of automobiles (Boyd, 1978 p.5). Federal Policies for inducing the development and adoption of innovative automobile technology are examined using welfare economics framework (Boyd, 1978 p.3). 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 p.3). 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 p.3). Uncertainties faced by manufacturers include costs of new technology, consumer acceptance, and the nature and magnitude of future regulations (Boyd, 1978 p.11).



### 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,p.1).

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 (Upadhya.2019,p.1).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 (Upadhya.2019,p.1).

A hindrance to the 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 issues? 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, 2019.p.1).The present research develops and validates, perceived usefulness and perceived ease of use, which are hypothesized to be fundamental determinants of user acceptance (Davis. D. F. 1989, p 319). 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. D. F, 1989, p. 319). There is a resistance to the adoption of innovation when the innovation is complex and the user cannot identify with the available system (Davis, D.F. 1989, p.319). Perceived usefulness and perceived ease of use are theorized to be fundamental determinants of system use (Davis, D.F, 1989.P.319). People are more apt to adopt when they feel there will be an improvement in job performance (Davis, D.F. 1989.P.319).

### Risk Mitigation

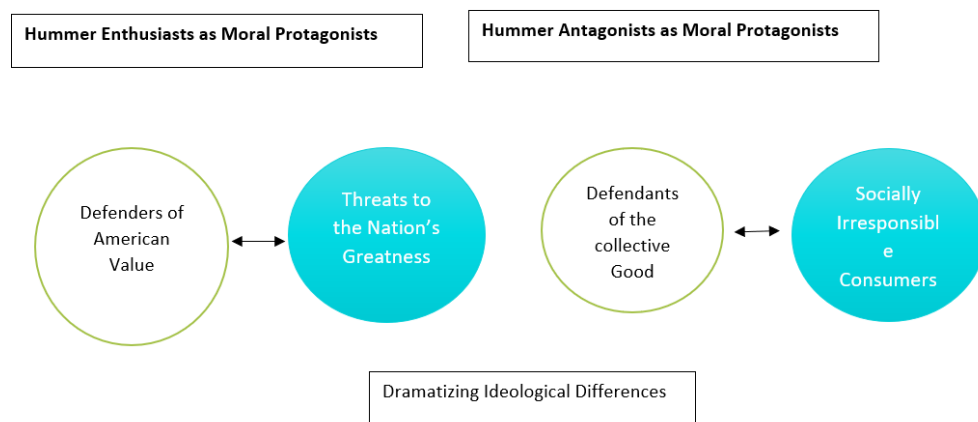
There are a variety of methods that can be used in project finance transactions to mitigate risks (Claws, 2016, 1.4.3). The most straightforward is to remove the risk entirely (Claws, 2016, 1.4.3).

Knowledge/ Problematic Assumptions

Consumption –Mediated Enactments of Morality Play

Case Illustrations

(Luedicke, Thompson, Giesler, 2010, P. 1029) (Table 2).



### 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, Chang, Chi, Chen, Deng, 2012, pp.441,442)?

How do these types of organizational capabilities influence the corporate radical innovation performance (Chang, Chang, Chi, Chen, Deng, 2012, p.442)?

How do we build a pipeline that delivers a steady stream of breakthrough innovations (Research **Technology** Management, 2010, 67).

Do we benefit from manufacturing it (Hippel, 1998,72)?

Do we benefit from supplying the components or material necessary to build or use the innovation (Hippel,1998,72)?

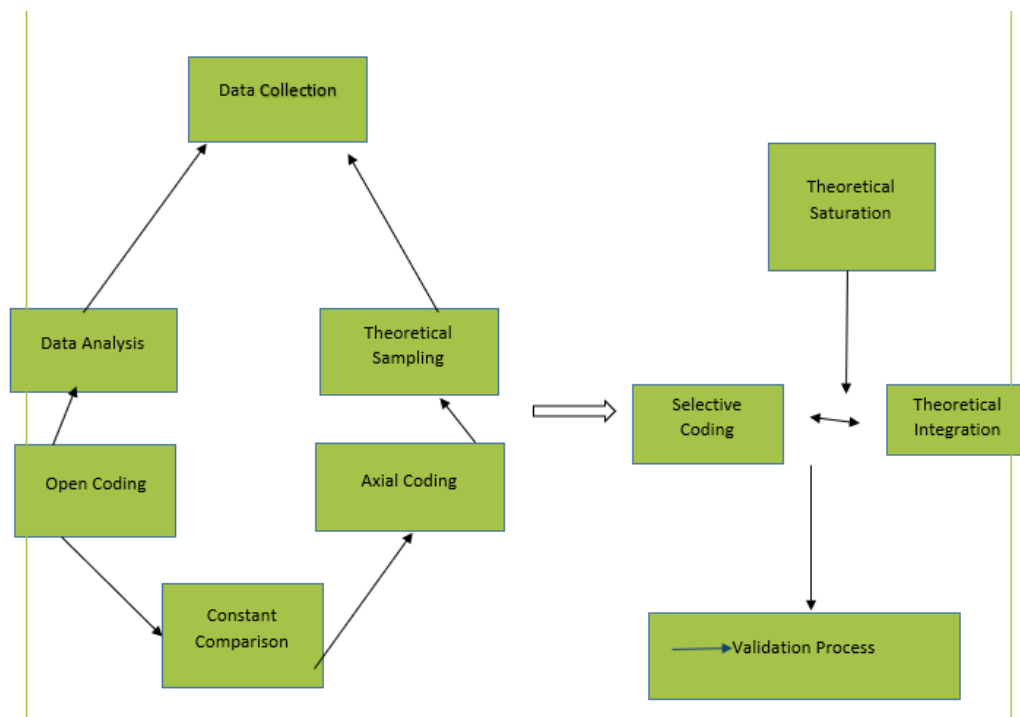
Is there a way to break out of this highly capitalized highly controlled, and generously uninnovative mode of production (Utterback,1994, 98)?

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

### Research Method(s)

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.

**Table 3:** (Kreuzer,2019, P.8).



## Components of Engaged Scholarship Research

**Table 4:** (Mathiassen, 2017. P.20).

Component	Definition
Journal	The target journal defines the audience for the research and the conversation in which the work participates (Mathiassen, 2017. P.20).
Title	The title expresses the essence of research design, with emphasis on C (Mathiassen, 2017. P.20)
P	The problem setting represents people's concerns in a real-world problematic situation (Mathiassen, 2017. P.20).
A	The area of concern represents somebody of knowledge in the literature that relates to P (Mathiassen, 2017. P.20).
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. (Mathiassen, 2017. P.20).
M	The method details the approach to empirical inquiry, specifically to data collection and analysis (Mathiassen, 2017. P.20).
RQ	The research question relates to P, opens for research into A, and helps ensure the research design is coherent and consistent (Mathiassen, 2017. P.20).
C	Contributions influence P and A, and possibly also F and M (Mathiassen, 2017. P.20).

### Literature Review

#### 2.1. Streams of literature

##### 2.1.1. Goal of this literature review

##### 2.1.2. Approaches:

**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 (Joseph A. Schumpeter, 2006, Article, pp, 11,13,17,18, 24). Schumpeter sought more sophistication and took the less conventional approach (Joseph A. Schumpeter, 2006, Article, pp, 11,13,17,18, 24). 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 (Joseph A. Schumpeter, 2006, Article, pp, 11,13,17,18, 24).

Eric Von Hippel "The sources of innovation", Transferring process equipment innovation from user –innovators to equipment manufacturing firms (Hippel, 1998, Book, R&D Management 8, no 1 October 1977 :13-22). Eric Von Hippel argued that variation in the sources of innovation is 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 (Hippel, 1988, Book, pp. 11,18,25).

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

The world philosophers explain a capitalist society. Robert L. Heilbroner 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 (Robert L. Heilbroner, 1999. book, p. 290).

Patrick Baert explains philosophy of the social sciences: towards pragmatism (Patrick Baert, 2005, book, p.1). 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 (Patrick Baert, 2005, book,p. 3,4 ).

Naresh K. Malhotra explains market research and the approaches to take such as qualitative and quantitative. Quantitative approaches consist of measurement, scaling, nominal scale, ordinal scale, interval scale, and ratio scale (Naresh K. Malhotra, book, pp. 252, 253, 254. 255, 256, 256, 272, and 273).

Arstrong. J.S., Brodie, R.J,Parsons, A.G. (2001). "Hypothesis in Marketing Science: Literature Review and Publication Audit. *Marketing Letters*", 12 (2), 171-187.

Welch. C., Piekkari, R., Plakoyiannaki, E., & Paavilainen-Mantymaki, E. (2011), "Theorizing from case studies: Towards a pluralist future for international business research. *Journal of International Business Studies*, 42 (5), 740-762.

Mathiassen, L. (2017), "Designing Engaged Scholarship: From Real-World Problems to Research Publications. *Engaged Management Review*", 1(1), 17-28.

Woodside, A.G. (2010), "Bridging the chasm between survey and case study research": Research methods of achieving generalization, accuracy, and complexity. *Industrial Marketing Management*, 39, 64-75.

### **Past findings**

Theme 1: e.g. "The main barriers to innovation. According to Christensen, the main barrier is the excessive focus on current customers' expectations "(Christensen, 2003, book 2, p. 222). For Von Hippel, the main barrier is lack of attention to customers' experimentations, etc. (Von Hippel, 1998, article 3, p. 332).

Theme 2: e.g., "The main ways a supplier can promote innovative solutions to their clients". According to Von Hippel, studying customers' experimentations (Von Hippel, 2001, article 2, p.123). Etc. For Millier, explicit partnership with suppliers should be set up (Millier, 2005, book 2, p. 525)

Theme 3.etc." Jeremiad against consumerism is compared to Moralism about Consumption and is shown to be similar" (Luedicke, Thompson, Giesler, 2010, article 2. p. 1016). Ideological beliefs from identity of being "American Exceptionalism" (Luedicke, Thompson. Giesler, 2010, article 1. P.1020).

Theme 4: e.g., "A majority prefer privatization as private sector for national security and defense was more efficient than the government" (Ann Hagedorn, 2014, article 1, location,1020). They felt that the democracy to the government had a long-drawn-out process (Ann Hagedorn, 2014, article 1, location,1020).

Theme 5 e.g., Paul Millier" explains the life cycle of innovation". Paul Millier explains the "transitory phase "during the innovation's project life cycle (Paul Millier, 1997, book, p.34).

The 6 e.g., James Utterback," discussed product and process innovation in terms of fluid, transitional, and specific phase" (James Utterback, 1994. book, p. 139). James Utterback provides a case illustration for America's Ice Industry (James Utterback, 1994, book, p.146). James Utterback explains radical innovation and how it invades (James Utterback, 1994, p. 145).

#### Knowledge gaps

Gaps are either issues not studied or where research is inconclusive (i.e., authors bring contradictory evidence).

Gap 1 – Government Alliances with Innovation Adoption.

Gap 2- Most relevant measures in technology, organizations, and countries.

Gap 3- Education Innovation vs Industrial Innovation.

Gap 4- Culture.

#### **Expected contributions of the research**

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.

#### **Contribution to academic knowledge**

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

Armstrong.S.J, Brodie. J. R., Parsons (2001), Literature review with exploratory approach, dominant hypothesis, competing hypothesis, and coding. University of Pennsylvania, University of Auckland, and Wharton School; Retrieved from <http://repository.upenn.edu/marketing-papers>.

Davis, D.F, (1989, pp.320,321), Perceived usefulness, perceived ease of use, and user acceptance of information technology. The research focuses on main scales and the measures.

Eric von Hippel draws on his years of innovation- related research to counter this traditional view Hippel, (1998, P.1). Innovation is not a mysterious event it is an economic one (Hippel, 1998, P.1). Logic meets institutional skill (Hippel.1998, P.1).

James Utterback., tests hypothesis and shows that there is a pattern to innovations in conservative markets. (Utterback, 1994).

Joseph Schumpeter best understood capitalism and its evolutionary development (McTeer, 2019. P.1). Joseph Schumpeter is remembered today for his controversial concept of capitalism's tendency for "creative destruction" (McTeer, 2019, P.1).

Millier,P.(1994). Marketing the Unknown; developing market strategies for technical innovations, P.154. Paul Millier believes alliances are the firm's best strength and that a firm should collaborate where they have their largest deficiency. (Paul Millier, 1997, book, p.34).

SBM's strategy has three phases (optimize, transform, innovate) (SBM, 2019, Corporate Strategy). SBM Offshore is committed to delivering consistent and efficient production and performance, while adhering to its sustainable environmental objectives (SBM, 2019, Our Operations, p.1). SBM focuses on Corporate Social Responsibility, Corporate Governance, Sustainability, Quality Regulatory, and increases investors to invest (SBM, 2019, Corporate Social Responsibility, p.1). Their successful track record begins in 1862. SBM's most recent successful innovation is the Fast4Ward floating device. The approach is focused on reducing cycle time to energy delivery, de-risking projects and improving quality and safety (SBM, 2019, What we do. p.1).

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Utterback's, fluid, transitional and specific stage (Utterback, 1994. Pg.94,95). These processes call for the same goal, standardization within an industry; consequently, Ice Harvesting confirms the past strategies are not applicable in today's environment as radical innovation sets in (Utterback, 1994. Pg.94,95).

James Utterback., tests hypothesis and shows that there is a pattern to innovations in conservative markets. (Utterback, 1994).

Utterback and Abernathy, "conceived the concept of dominant design and delivered information on radical and incremental innovation" (Baumol, 2008, 20) (Holzl, Janger, 2013, 20). "Entrepreneurial high-growth firms play an important role in radical innovation" (Baumol, 2008, 20) (Holzl, Janger, 2013, 20),

Hagedorn. A (2014), "The invisible Soldiers; How America Outsourced our Security", was a very large contribution to the research. Ann Hagedorn delves into "The faint hum of secrecy", "Rules of engagement" and "Privatized". This was a strength to the Literature Review as it was informative that privatization is invisible, and a firm may not be aware of who they are hiring. This information is imperative when working with the government and building alliances and working towards standardization of innovation.

## **Journals**

Operations and Technology Management.

Journal of International Business Studies.

Industrial Marketing Management.

## **Case Studies**

Harvard, MIT, IMD, Google Scholar.

### Contribution to managerial knowledge

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