SSE Working Paper Series in Business Administration
No. 2017:3

DECISION EVALUATION OF INNOVATION OFFSHORING: Swedish R&D in India

Rupin Jeremiah [a]

[a] Stockholm School of Economics
Department of Management and Organization

DECISION EVALUATION OF R&D OFFSHORING: Swedish R&D in India

Stockholm School of Economics
Rupin.jeremiah@phdstudent.hhs.se

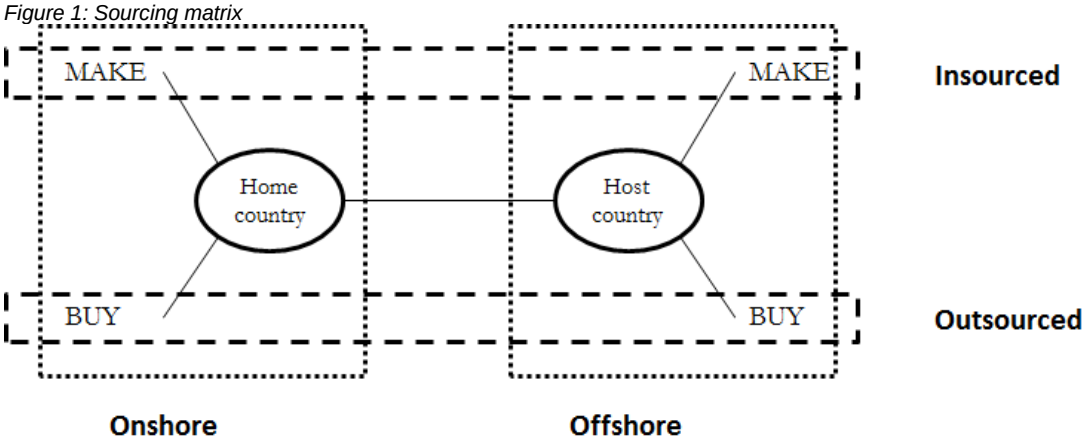
Abstract

This is a study of Swedish firms that have offshored some of their R&D functions to India. How managers view offshoring decision choices within and across firms and how can we evaluate the decision making is the subject of this study. The sample is a set of Swedish firms with some R&D facility in India. Data are collected from interviews with managers and decision makers from both the Swedish and the Indian sides, responsible for implementing the offshoring decisions. The result is the development of a decision quality evaluation framework which can be used to possibly make better quality decisions when offshoring R&D.

Offshoring R&D

Offshoring has been a business strategy for several years now and has been seen as new managerial practice with its origins possibly in the late seventies (Lewin & Peeters, 2006). The relocation of parts of firms' value chains from their home countries to foreign locations has been an important strategic decision for many companies in order to remain competitive in a globally dispersed marketplace. Global sourcing now comprises three different activities that have been sourced – manufacturing, information technology and business processes (Roza, Van den Bosch, & Volberda, 2011). In the global race for talent however, firms have now started considering offshoring innovation as a viable business strategy (Lewin, Massini, & Peeters, 2009). This study could build on earlier research on Scandinavian offshoring experience in India (Koch, 2013), longitudinal studies of offshoring strategy (Šmite & Cruzes,), and specific case studies, for example Ericsson's experience in India (Šmite, Wohlin, Aurum, Jabangwe, & Numminen, 2013), to establish a framework to develop a Swedish model of offshoring innovation to India, i.e. identifying the offshoring drivers, functions, location and governance mode choice involved in offshoring (Roza et al., 2011). 'Offshoring' and 'outsourcing' are often used generically to mean the same thing, though they are distinctly different. Outsourcing refers to the decision to buy products or services previously produced internally from another (domestic or offshore) company where as offshoring refers to a domestic company obtaining services from a foreign-based company, be that a subsidiary (captive or international in-sourcing) or an independent service provider (offshore outsourcing) (Massini & Miozzo, 2012). There are four main options for sourcing strategies when choosing what and where to relocate services (Bunyaratavej, Doh, Hahn, Lewin, & Massini, 2011). For my study, these definitions capture the offshoring scenario to include firms that offshored via 'make', 'buy' and in some cases 'ally' decisions while choosing between producing internally and sourcing from an external provider for their R&D. An illustration of the sourcing strategies is provided in the figure 1 below. This study considers the 'offshore' block shown (which includes both the 'make' and 'buy' decisions).

Figure 1: Sourcing matrix



Source: Own elaboration

Managers, not firms, make decisions and because they are human, are prone to make imperfect decisions. I am interested in studying the managers' views of the offshoring phenomenon and how similar their views are with other managers within their own firm and across firms. Can we evaluate the quality of their decision making and could it lead to better decision making in offshoring?

Current Literature

Offshoring of R&D, like any internationalisation relies on the decisions making abilities within the firm, and these abilities comprise people, processes, and technology systems. Decision theory is an interdisciplinary science and is one of the fundamentals in the field of strategy. Decision theories are either normative or descriptive. A normative decision theory is about how decisions should be made, and a descriptive theory is about how decisions are actually made (Hansson, 1994). This paper is about how a manager actually makes decisions for offshoring, so this is descriptive decision theory. There doesn't seem to be consensus on where the starting point is of the discussions around decisions. Perhaps the first modern treatise of decision theory was provided in 1910 by John Dewey who proposed suggestion, intellectualisation of a difficulty into a problem, development of hypotheses, mental elaboration of these, and hypotheses testing as five phases of thought (Dewey, 1997). Simon (1960) modified Dewey's five stages into three decision phases and contextualised them for organisations. These phases were broadly classified as intelligence, design, and choice. Brim (1962) provided a substantial contribution to decision theory when they divided the decision process into five steps: identification of the problem, obtaining necessary information, production of possible solutions, evaluation of such solutions, and selection of a strategy for performance. All these decision models are, however, sequential. Strategy doesn't always work this way, so an alternative non-sequential decision model was proposed by Mintzberg, Raisinghani, & Theoret (1976). They used the same three major phases as Simon, but gave them new names: identification, development and selection, which were further supported by 3 routines and 6 dynamic factors. Hansson (1994) has neatly provided a brief history of the evolution of decision thought and his comparisons are provided below in figure 2.

Figure 2: Evolution of decision thought

Developer	Decision Process Stages
Condorcet (1793)	First discussion
	Second discussion
	Resolution
Simon (1960)	Intelligence
	Design
	Choice
Brim et al (1962)	Identification
	Information collection
	Solution generation
	Evaluation
	Selection
Mintzberg et al (1976)	Recognition
	Diagnosis
	Judgement
	Authorisation

Source: Adapted from (Hansson, 1994)

Humans are imperfect and so are their perceptions. Because of these imperfections, changes of perspective can reverse the relative apparent size of objects and the relative desirability of options (Tversky & Kahneman, 1981). In realistic decision making, judgements are based on heuristics, biases, values, predictions, and alternatives, which could be governed by the insensitivity to prior possibilities of outcomes, availability due to retrievability of instances (Tversky & Kahneman, 1974) or due to incomplete information (Brunsson, 1982). It is this same assumption that we as humans are poor knowers so all decisions should be treated as experimental and decisions should be structured such that they are reversible of easily modifiable (Etzioni, 2014). Decisions can be as choices, as mobilisers, as responsibility allocation, and as legitimation which are presented as the four roles of decision by Brunsson (1990). A summary of the various ideas from some of the relevant literature is presented in table 1.

Table 1: Discussions on Decision Theory

Theme	Developer(s)	Central concept
Phases of thought	(Dewey, 1910)	Linear decision theory
Decisions as problem solving in organisations	(Brim, 1962; Simon, 1960)	Linear decision theory
Decision theory model	(Mintzberg et al., 1976)	Non sequential decision theory
Evolution of thought	(Hansson, 1994)	Decision theory
Probability, size, and possibility of options	(Kahneman & Tversky, 1979; Tversky & Kahneman, 1981)	Decisions under risk
Roles of decisions	(Brunsson, 1982; Brunsson, 1990)	Organisational decision making
Irrationality in decision making	(Brunsson, 1982; Brunsson, 1993)	Organisational decision making
Managing organisational paradoxes	(Smith, 2014)	Dynamic decision making
Reversible and modifiable decision making	(Etzioni, 2014)	Experimental decision making

Source: Own elaboration

In the exploration of decision making in the context of this research, my study looks at whether the decision making is individualistic, institutionalised, or ideological, and if there is a logic or method in the decision

process. In my view, rationality is a fuzzy subject that I find difficult to define so conformation to a process is the characteristic that is studied in lieu of that. I strongly believe that the motivation for decision rationality is thinking and choice but most firms may prefer efficiency and co-ordination, so decisions can be somewhat irrational in order to achieve these goals. There will, however, still need to be logic and method in order to produce these. I contribute to a better understanding of how knowledge of a firm's internals may be used to provide some foundation to allow organisations make better strategic internationalisation decisions. This capability based decision making will utilise parts of the decision making theory and the resource based view of the firm and form the theoretical foundation of this dissertation. How best to operationalise the capability of the firm to facilitate internationalisation decision making remains a considerable challenge in international strategy and not much has been said about how to evaluate the quality of decision making in this context. With this paper, I answer the question:

How can the quality of decision making be evaluated when managers offshore R&D?

Method

The sample for the research is segregated based on the grid shown in table 1. The grid is a view separated by industry type and firm size. The data categories of size and industry activity are originally from Bureau van Dijk's Orbis1 database. Orbis contains information on nearly 150 million companies worldwide, with an emphasis on private company information. For the purpose of this study I have combined firms in Information and communication, and Services into a category 'Technology and Services'. There are now two categories – Manufacturing, and Technology and Services. Furthermore, for the size I have simplified the sample into large and small. I don't except any major differences between 'large' and 'very large', and 'small' and 'medium', so I have considered 'Large' to include both large and very large, and 'Small' to include both medium and small. I would expect firms in the manufacturing sector to be on the larger side just because of the type on investments they have and the products they sell. A summary of the numbers of firms segregated by size and industry activity is shown in table 2.

Table 2: Sample selection grid

Category		
Technology and Services	1	3
Manufacturing	3	3
	Large	**Small**

There are several scenarios that I considered for this research in terms of the research setting for selecting cases to isolate. Each of the choices had its merits and challenges.

1) Swedish firms from different industry sectors offshoring to India;
2) Swedish firms from the same industry sector offshoring to India;
3) One Swedish firm that offshored R&D to India

Basing my judgement on the sample I had and the contacts within those firms, I discarded option 2 because I did not have enough information to further a research study. Getting access was a problem and I would

[1] http://orbis.bvdinfo.com

have had very few interviews to use to develop a convincing study. I rejected choice 3 on two grounds. Firstly, I did not want to localise my study to just one firm as that would make it too firm specific and it would have been hard to isolate exactly which firm I would need to study. Secondly, in most firms there would be only three of four direct decision makers and that would be too few to study any possible divergence in viewpoints between managers. Thus, I settled on option 1 and selected as many firms as was possible before narrowing down the selection depending on response rates and ease of access. I consider two very different industries (one traditional, production intensive industry and one services orientated or knowledge intensive industry) and explore their managerial decision making processes. Firms belonging to these two industries are selected for the research study. It is interesting to study the offshoring R&D from two different looking industries.

Data are collected via interviews with the decision makers in the selected firms, questionnaires sent via emails, and some information from the firms' websites. All interviews were recorded with a digital voice recorder, with prior permission of the interviewees. I transcribed verbatim, all the recordings into text documents. 1 hour of recording took approximately 6-8 hours to manually convert to text information. I analysed the resulting text files for keywords, common themes, and 'interesting' revelations or information. The summary of these details is shown in the table 3.

Table 3: Interview details

FIRM	DECISION MAKER	FUNCTION	NATIONALITY
F1	F1.M001	Management	Swedish
F1	F1.M002	Technology	Swedish
F1	F1.M003	Management	Swedish
F2	F2.M001	Management	Swedish
F3	F3.M001	Management	Indian
F3	F3.M002	Technology	Swedish
F4	F4.M001	Management	Swedish
F4	F4.M002	Technology	Swedish
F4	F4.M003	Technology	Swedish
F5	F5.M001	Management	Swedish
F5	F5.M002	Management	Swedish
F5	F5.M003	Technology	Indian
F6	F6.M001	Management	Swedish
F6	F6.M002	Management	Swedish
F6	F6.M003	Technology	Swedish
F6	F6.M004	Technology	Swedish
F7	F7.M002	Technology	Swedish
F7	F7.M002	Management	Indian
F8	F8.M001	Management	Indian
F8	F8.M002	Technology	Indian
F9	F9.M001	Management	Swedish
F9	F9.M002	Management	Swedish
F9	F9.M003	Technology	Indian
F9	F9.M004	Technology	Indian
F10	F10.M001	Technology	Swedish

The firm names are aliases and are codes that will be used in the manuscript wherever the corresponding firm is referenced. These codes were used during the coding and analysis phase also to easily make groups and clusters. Some respondents preferred detailed questionnaires in addition to being interviewed. The questionnaires were sent via email and the responses were analysed in the same way as the interview transcripts were. Questionnaires were also sent in certain cases to managers previously interviewed, when follow up clarifications were needed. The reasons why there are differences in the numbers of interviewees across the firms are because of the type of firm and the access to information of the individual managers. F6 and F9 are large conglomerate firms with several levels of management and the individual managers I interviewed had only partial views of the whole picture of the scenario. Only after interviewing 4 managers from each firm did I get a good enough perspective of the offshoring. F2 is a small firm with very few direct decision makers. Decision maker F2.M001 had access to all the information and was completely involved in all stages of the decision making so another perspective might not have added any new insight. F10 was a case of re-shoring and the decision maker F10.M001 whom I interviewed provided enough information about both the initial offshoring and the subsequent re-shoring. For all the other firms, I could capture enough detail from interviewing 2 or 3 people as the case may be, to make a good assessment of the respective cases.

Decision Views

This first part is an explanation about how managers view this phenomenon and the themes that they discussed the most during the interviews. Some of these themes, as I will present, were generally the areas of concern for the managers where more thought was needed or more time was taken during the decision making process. These opinions varied within a firm as well depending on whether a manager is Swedish or Indian and whether the manager belongs to the management function or to the technology function within the decision making team. The illustration that follows is the presentation of the generalized viewpoints of the managers, shown by manager's role and nationality. These views are a divergence within the a specific firm as because it represents a somewhat different view of a manager from a specific function in India or in Sweden, but it tends to represents a convergence of views of managers across firms belonging to a particular function and a particular nationality. Thus the same view of offshoring and decision characteristics lead to a somewhat different interpretation within the firm and across firms. When managers are grouped by function and nationality, their views suggest a possible bias arising from their identity in these two groups, and these can be different from the views held by managers whose identities are in a different group.

Considering the aggregated themes, the study shows that Indian managers tend to be more optimistic when it comes to offshoring decisions. This is possibly a result of their first-hand knowledge of the Indian market, industry, and environment. As seen in the table, Swedish managers tend to place high value on maintaining tight management control at the offshore R&D centre. Even in this case, it tends to be only the Swedish managers from the management function who have this concern. Management employees would need to have stronger management processes in place to justify an offshoring decision while technology employees may not be as concerned about a closed governance structure offshore.

DIVERGENCE (AND CONVERGENCE) OF MANAGERS VIEWS BY ROLE AND BY NATIONALITY

DECISION OPTIMISM	RESOURCE CONFIDENCE	DECISION PROCESS	DECISION CHALLENGES
Management Control (M, S)	Lack of Quality (T, S)	Fuzzy Definition (M, SI)	Operational Inefficiencies (MT, S)
Prior Offshoring Experience (MT, S)	Depth of Knowledge (MT, S)	Usage of Tools (MT, S)	External Environment (T, S)
Indian Context (MT, S)	Competence (T, I)	Mode of Entry (MT, S)	Distance (M, I)
Retain Core Activities (T, SI)	Confidence (MT, S)	Project Selection (MT, S)	Culture and Language (M, S)
Decision Ease (T, S)			

Manager's role and nationality
M: Management function
T: Technology function
S: Swedish
I: Indian

Example
MT, S: Swedish managers from both Management and Technology functions
T, I: Indian Managers from the Technology function

The Swedish managers from both functions discuss the importance of the presence of an Indian context or previous offshoring experience, in being optimistic towards the decision. This suggests the requirement of comfort factors that help in building the confidence of the Swedish managers' decision making process. This is absent from Indian managers' thinking because they possibly already have the implicit confidence of the knowledge of the local turf. Technology managers from both Sweden and India view core activities as critical and recommend retaining those in Sweden. The management employees do not share this view and it is possible that their detailed understanding of the R&D function is quite different from what it means to the managers who belong to the technology function. Core R&D activities are directly under the domain of the technology function, so the managers belonging to this function in both India and Sweden are more motivated in trying to ensure that the R&D function remains manageable.

Resource confidence is another area of differing views of the managers. Swedish technology managers raise concerns about the lack of quality emerging from the Indian centre, while this is not a concern shown by the Indian group of managers. This suggests a difference in understanding of what constitutes quality. It is possible that the Indian managers have a lower threshold than Swedish managers have, for what is good quality, and this is reflected in their views within the firm and it is a common thread across firms for Swedish technology managers. Swedish managers who are in the management function are not as concerned with

the ‘definition’ of quality, suggesting that they tend to be somewhat removed from the R&D activities that emerge from the Indian centre. Swedish managers in both functions express concerns about the depth of knowledge possessed by the Indian staff and have a lower confidence level in the offshoring phenomenon than Indian managers have. This results in overall lower confidence in resource capabilities in India. This results from a difference seen in the quality as discussed earlier and a lack of knowledge or possible visibility of the Indian facility and staff. Resource competence is surprisingly a concern raised mostly by the technical managers in India. This could possibly be a result of new processes, technologies, and less than optimal trainings and learning transferred to the Indian resources. Within firms this resource confidence is a divergent view but finds similarities across firms in similar groups of managers.

The table presented explains how managers’ views diverge intra-firm depending on whether they are in the technology or in the management role, and whether they are Indian or Swedish. While these views can diverge within the firm they can converge across firms with managers in similar identity groups. This is an interesting result of this study and shows that often managers can tend to hold different views within their firms but can have similar thoughts across firms. The definition of R&D varies among the managers. Managers in the technology functions in both India and Sweden are clear about what R&D means in their firms while, the definition is not quite clear for managers who belong to management functions. This indicates some distance that exists between the management function and the definitive knowledge of the R&D function, which is clear for the technology managers. Swedish managers tend to be slower and more cautious when assessing the mode of entry for establishing an R&D facility in India and for selecting an appropriate initial R&D project, as also evidenced by a greater usage of analysis and tools in decision making. The Indian managers are more enthusiastic when talking about both the mode of entry and the entry project. This suggests a possible lower overall confidence level initially in an Indian centre, as we discussed earlier. Indian managers exhibit a higher degree of optimism so they tend to spend lesser time in choosing entry criteria for the R&D setup in India. Thus a Swedish manager in a firm will tend to differ from an Indian manager in entry criteria discussions but Swedish managers across firms would tend to think alike.

Culture and language dissimilarities are important criteria in the views of Swedish managers in management roles. Technology managers in Sweden and Indian managers in general are not necessarily as pessimistic about these because of two possible reasons. Firstly technology managers tend to speak the same language – the language of the product development – so that has more in common than with management employees between countries. Secondly Indian managers do not consider cultural differences so important in R&D delivery. Having explored this, it is interesting to observe that distance in fact is more an issue in Indian managers’ views than it is for Swedish managers. This is more from a knowledge and process transfer perspective where a higher geographic distance slows down this handshake. Operational inefficiencies in work practices are important considerations for Swedish managers across both roles. This is possibly also similar to lower confidence levels Swedish managers have on the ability of the Indian centre to deliver quality R&D, as the discussed earlier in this section. Indian managers do not share this view.

Decision Quality

Decision quality is a recent topic and has some interesting research studies on it. During decision making there is a tendency for the collective group to override realistic appraisals of the situation and this leads to a lack of criticism in the decision making group (Postmes, Spears, & Cihangir, 2001). Managers tend to rely on

heuristics and personal experiences rather than on systematic or algorithmic strategies during decision making (Klein, 2008) and this leads to people using their experiences as a means of justification according to the patterns they observed from past learnings. Certain perceptions of the managers and the environment affect the quality of decision making. Perceived loyalty affects decision quality and perceived competence affects decision commitment (Dooley & Fryxell, 1999) while time pressures reduce the quality of the decisions (Kocher & Sutter, 2006). According to some research, decision success is a measure of decision quality which in turn is considered to be a function of performance. In their study, Davern, Mantena, & Stohr (2008) propose that decisions should be judged good or bad not by the outcomes but according to the quality of the process by which they were made, while Dean & Sharfman (1996) explore the link between decision making processes and decision success. Raghunathan (1999) studies the relationship among information quality, decision-maker quality, and decision quality to explore the impact information and managers have on the quality of decisions.

I explored the quality of the decision making from two views: first, the triggers for the decision to go offshore which indicate the various factors influencing the decision making, and second, the post-entry challenges the managers faced, the magnitudes of which indicate the competence level of the decisions that were made. These inhibitors and justifiers are presented firm wise in the table shown and these have been obtained from MAXQDA by collecting the views of all the decision makers and grouping these firm-wise. These are then transformed into accelerators and decelerators. The 'accelerators' are the decision legitimisers that managers use to justify their offshoring choices while the 'decelerators' are the factors arising post-entry that inhibit progression of the innovation establishments offshore. These are decision quality determinants and together these help evaluate the quality of the managerial decisions.

How the transformation has been done is explained in this and the next paragraph. The factors that pertain to quality in terms of challenges faced in India when it comes to delivering quality, differences in what quality means between Sweden and India, and how teams view the same deliverable are all manifestations of a difference in the understanding of quality. This is the common decelerator across firms when quality related issues are concerned. Competence related challenges are transformed into a decelerator for gaps in offshore competence. This may comprise a lack of depth of skills, generally lower competence levels among Indian staff, not being exposed to the latest European designs, the Indian staff exhibiting a high learning curve, or the requirement to bridge skill gaps with a lot of technical trainings. Product related inhibitors in terms of not being able to see the whole product at any time in the development work, and working on small parts of the product are a failure to see the full picture and this inability to see the entire product is a decelerator. Management and leadership issues, organisational process problems, efficiency issues, and the requirement of a lot of change management in the offshore centres lead to inefficiencies in operations which in turn is the decelerator that is hindering the progress of innovation. Knowledge attrition is a decelerator that arises from the difficulty to retain skilled talent in India and a general high attrition rate in India. At a firm level there is a decelerator for the lack of depth of knowledge. This is a result of individuals not possessing the required product, design or tools knowledge, knowledge leaving the firm when an individual leaves, or a lack of deep knowledge because engineers work on short term projects and never acquire in-depth knowledge in the area they work in. The need to have people at the same place and issues with long distance communications highlights the significance of distance which is another hindrance to the progress of the

offshore centre. Lastly, a very important decelerator is unlearning, which could be required to produce a simpler product or to learn to knock down functionality and additional features in design and development.

Transformation: Inhibitors to Decelerators

Inhibitor	Decelerator
Quality level in India Translate the meaning of the quality Challenge to deliver quality How teams view the same thing Some issues in quality problems	Differences in the understanding of quality
Gradual raising of competence Difference in depth of skills Different competence levels Gradual raising of competence Technical gaps in skills Competence levels are not high High learning curve Not exposed to latest designs Need to bridge gaps with lot of trainings Inadequate skills	Gaps in offshore competence
Technology level immaturity	Immature market or technology
Not seeing the product fully Poor product visibility See only the small parts not the full picture	Inability to see the entire product
Slowing down of processes Inefficient operations Efficiency reduction Little more bureaucratic in India Lot of change management needs Management and leadership issues Lot of delegation and co-ordination needs Need to build better processes	Inefficiencies in operations
Difficult to retain knowledge Heavy attrition of knowledge	Knowledge attrition
Not enough knowledge No experience being handed over Challenges of contextual knowledge Lack of deep knowledge Product knowledge issues Engineers work on short projects Hard to find people with ready knowledge Differences in product and application knowledge	Lack of depth of knowledge
Long distance communications Teams can be quite disconnected Need people at the same place	Significance of distance
Need to produce a basic product Hard to knock down functionality Develop simpler products	Unlearning

Source: Own elaboration

When it comes to decision justifiers, these are transformed into accelerators which assist in legitimising decision making choices. The degree of Indian context is important and this can arise from the existing presence in India of suppliers, partners, or production units or it can be a result of the presence of extensive market or local knowledge. The thought of India being a large market, with a huge potential user base, and the opportunity to become an important supplier in India are all transformed into a decelerator for a firm perceived opportunity size. If the firm in question has offshored centres before in India or elsewhere, or if they already present in the market with a production unit, then the firm's experience of offshoring becomes an accelerator. The presence of many firms and using the logic other firms may have used is a strong

decision justifier and hence following the logic of others is an accelerator. Decisions may also be justified based on the accelerator for individual expertise. This stems from decision makers having some kind of Indian context, by being Indian themselves or by having worked in India or by being involved in an Indian offshoring assignment previously. When decision makers talk about how their technology or product can make a difference to the market, or if there is a shortage of some resource in India which they can supply, then this need to develop the market becomes an important decision making accelerator. India is perceived to still be an attractive centre for offshoring even it is not necessarily for R&D offshoring. When decision makers discuss India's tradition for offshoring and how their decisions are also linked to India's past trends of offshoring then this becomes a decision accelerator. Finally, the presence of R&D clusters is an important accelerator. When decision makers talk about being close to high technology and competence, gaining access to R&D ecosystems and competence clusters or being inside networks and benefitting from the co-ordination in the industry then this accelerator is an important decision legitimiser.

Transformation: Justifiers to Accelerators

Justifier	Accelerator
Already had an existing supplier Already had plants in place Already had an existing partner A lot of market knowledge Having a complete understanding of the country Local team had the knowledge	Degree of Indian context
It was market size and previous connections It is a huge market Huge potential user base Market evolving well in India Big opportunity to be a supplier	Firm perceived opportunity size
Already had plants in place Offshored centres before Already present in the market	Firm's prior experience in offshoring
Lot of small and mid-sized companies are there Can use the logic others have chosen Many firms are already there	Follow the logic of others
Two founders have Indian roots Manager had offshoring experience Manager worked in India before Manager is from India Knew the market, people and country	Individual expertise
Technology can make a difference in the market The right product can make a difference Large need of energy in India	Need to develop the market or technology
Still important centre for offshoring Decision was linked to past trends of offshoring India has a tradition of offshoring	Past trends of offshoring reasons
Closer to high technology and to competence Lot of co-ordination with the industry Lot of engineering firms exist in India Access to competence centres and clusters Presence of R&D ecosystem	Presence of R&D cluster

Source: Own elaboration

Exploring these accelerators and decelerators takes into account the individual, firm, and environmental (external to the firm) contexts. All these influence the factors being considered. In the individual context, the factor exists because of the presence (or absence) of, or the personal experience of, a particular individual

or group of individuals in the decision making process or in the firm in general. The firm context indicates that the factor is a characteristic of and endemic to the firm. The firm level determinants could be tacit knowledge existing in the firm, resources, or certain capabilities that exist in (or are missing from) the firm. The environment context signifies factors that are industry wide or otherwise external to the firm. This could be a result of institutional influences, economic factors, technology factors, competition, and market forces. Managers use information arising from all these contexts to justify their decisions. They take information from their personal experience, the firm's collective knowledge, and from external sources, and use those to justify their choices. The inhibiting factors also emerge from these three contexts and act as somewhat negative forces to innovation progression.

The quality determinants are detailed in the following table, segregated by the determinant type and the contextual level.

DECISION QUALITY

	Accelerators (Pre-entry)	Decelerators (Post-entry)
Individual level	- Degree of Indian context - Individual expertise	- Gaps in competence - Difference in understanding of quality - Lack of depth of knowledge
Firm level	- Firm's experience of offshoring - Follow the logic of others - Firm perceived opportunity size	- Unlearning - Inability to see the entire product - Significance of distance - Inefficiency of operations
Environment level	- Presence of R&D clusters - Need to develop the market or technology - Past trends of offshoring reasons	- Knowledge attrition - Immature market or technology

Pre-Entry: Accelerators

The 'accelerators' that emerged from the interviews with the managers are:

1. Perceived opportunity size

India is a large market providing sizeable opportunity in both the manufacturing and technology sectors for an international firm. Firms that look to have a research centre in India see this potential market opportunity as a window for generating volumes sales for any new or modified products that they may develop. This opportunity may not always be a correct fit for the firm's portfolio and potential offerings but this perceived market size is a strong determinant for managers deciding to open an R&D facility in India.

2. Degree of Indian context

Decision making acquires a higher level of confidence when there is a higher degree of Indian context within the firm. This can be availability of India-specific experience of managers in the firm either due to the presence of senior managers with an Indian background or from Swedish managers who have worked in India before. This often first-hand experience of India brings with it knowledge of the Indian market, culture, and understanding of institutions. This knowledge leads to an assumption of a better understanding of the Indian market and business environment and hence is a strong decision justifier.

3. Presence of R&D clusters

Some regions in India, for example, Chennai in south India and New Delhi in north India are industry corridors[2] where firms from the same industry form clusters to seek the same benefits of resources, infrastructure, taxation cuts (if applicable), and networks. The logic some firms in this study use is that a cluster of R&D facilities in a particular region indicates a development of resources and infrastructure for that industry and accessing these would be beneficial for their own potential centre as well. Lesser investments would be required in trying to develop their own R&D centre because many of the pre-requisites are already present in that region.

4. Past trends of offshoring reasons

According to A T Kearney's 2016 Global Services Location Index (GSLI)[3], out of the total 55 countries analysed India was rated the world's largest destination for offshoring functions, especially in technology and services. However, there have been several spikes and troughs in the offshore market ever since India became an attractive destination. It is not yet known how long this life cycle will last and we also don't know whether a firm offshoring to India now will receive the same value benefits as a firm that offshored a decade ago did. The offshoring trend is still a strong incentive that managers consider in their decision making process.

5. Prior experience in offshoring

This determinant can be viewed from two angles. First, firms that already had a production centre in India considered this as an advantage because a lot of the groundwork in opening a facility in India had already been done. Second, firms which had an offshore centre in Asia or in another developing country assumed many of the challenges to open a centre in India would be similar. In either case, the managers of these firms were somewhat more confident of using this previous experience of the firm as a positive influencer in the decision making.

6. Follow the logic of others

From the discussions with managers phrases such 'obvious reasons', 'we all know that', and 'everyone goes there' emerged as quite commonly used terms and these suggest a somewhat taken for granted attitude. Mostly for firms F2, F6, and F7, was this logic considered important. These are technology firms and to an extent this thinking seems intuitive because has been a centre of technology outsourcing. If other firms similar in size and product offerings exist there and are performing well, then there is no reason that their firm cannot as well. The logic used for going offshore is also similar even if internally each firm may be organised quite differently with different strategic goals offshore. The presence of other firms already performing R&D in India is enough motivation for managers to justify their own decisions.

7. Need to develop the market or technology

Firms F2, F7, and F10 have an innovative product or solution which does not exist in the Indian market. The need to introduce a new technology into India or to access a nascent market previously not penetrated by a similar product is an attractive force for managers to consider during their decision making process. This determinant is related to a perceived market opportunity and managers see it a first mover advantage by

[2] http://www.ide.go.jp/English/Publish/Download/Dp/pdf/103.pdf

[3] https://www.atkearney.com/strategic-it/global-services-location-index

being the first firm to introduce a product to fulfil a market need. This could also be an inhibitor as explained later in this section, when a market not being technologically ready can actually prove to be a hindrance.

Post-Entry: Decelerators

The 'decelerators' that emerged from the discussions with the managers:

1. Gaps in offshore competence

India provides many engineers and scientists in large numbers because of its many engineering and science schools. However, there are a few problems concerning the quality of the skills. Managers from all the 10 firms in this study have mentioned there is a big difference between a good engineer and an average engineer in India while that difference is quite small in Sweden. Also many engineers in India have never worked on the more sophisticated technologies that are common in Europe. Availability of skills does not always translate into quality of skill and also does not mean current or relevant skill. Managers making decisions would need to perform better due diligence of skills requirements and capabilities to minimise the impact of possible lower competence levels.

2. Lack of depth of knowledge

European engineers tend to be more 'loyal' and stay in a firm longer than Indian engineers do in India. Also, they stay as engineers for longer periods of time than do Indian engineers. Managers from all 10 firms discussed the lack of knowledge as a factor that needed a high degree of attention in order to progress with the R&D centre. The combined effect of engineers and scientists leaving for another firm or their promotion to non-engineering positions leads to a poor flow of knowledge in the Indian engineering function. It becomes more difficult to find engineering resources possessing deep functional knowledge of complex machinery and tools. This is a potential hindrance to delivering value in innovation and is an important discussion for managers to have.

3. Differences in the understanding of quality

Several managers in this study, notably from firms F1, F3, F4, F5, and F9 have discussed the culture of quality of Swedish customers and the way Swedish firms and customers view quality. This tends to be quite different from the concept of quality for Indian engineers and for Indian customers. This difference in the understanding of quality manifests in the way Swedish and Indian engineers in the same firm view the same task. Often for an Indian engineer a task is complete if all requirements are met but for a Swedish engineer aesthetics and elegance are also as important as the technical specifications. This can slow down the innovation process because of the differences in the benchmark of what constitutes a quality product.

4. The significance of distance

Distance appears to be a significant discussion in some firms, and particularly in manufacturing firms. Firms F4, F5, F8, F9 and F10 are all in the manufacturing sector and managers from these firms refer to distance as a crucial inhibitor to getting work optimised. Distance here refers to both geographic distance and time-zone differences but not so much to national cultural differences. Managers speak of 'sheer distance', 'pure distance' and similar phrases and associate that with co-ordination overheads, communication overheads, and issues with knowledge flows. Not being able to resolve any design and development issues and conflicts in an optimal way time-wise can be a potential hindrance.

5. Inability to see the entire product

Working on a part of the research and not being able to fully visualise the entire product is also a factor that affects manufacturing firms more than it does technology firms and is mostly a bigger issue for the larger firms. As evidence firms F4, F6, F8 and F9 discuss this as a problem. These are all large firms. The R&D in India is configured in a way that engineers rarely work on the whole product or process but only on specialised parts and thus don't get to see the final product. In Sweden it is somewhat different as the engineers can easily view the entire product because they are often co-located. This leads to possible asymmetries in knowledge offshore for and a poorer understanding of the product.

6. Simple products and unlearning

From discussions with some managers, we learnt that Indian products can tend to have simpler specifications than the European counterpart. Most noticeably for firms F4, F5, and F8, which are large manufacturing firms, they are not used to produce simpler products as their core philosophy is to provide sophisticated products to the market, but the cost of those products is not acceptable in India. This results in firms searching for a similar but lower level product that the customers are willing to pay for. As discovered in this study this needs some 'unlearning' by the engineers and that is much harder to do than 'learning'. Engineers and scientists are trained to strive for developing better designs, better products, ever more sophisticated functionality, and going in a somewhat opposite direction is very difficult for them to do. Simpler products in terms of specifications or developing a basic version of a product can hamper the creation of value that is achieved by product innovation.

7. Immature market or technology

Managers in some firms F2, F7, F8 and F10 talk about developing the market or technology as a key motivator in performing research activities in India. While this is an opportunity to deliver a relevant product to the market it can also prove to be a great challenge to overcome as was discovered by one firm, F10, which had to finally re-shore because their portfolio was too sophisticated for the Indian market. Sometimes the market is not ready at that time for a particular kind of product. Managers need to assess the technology readiness of a potential market while making decisions on innovation.

8. Inefficiencies in operations

Operational inefficiency was a common theme discussed mostly by managers from firms F1, F4 and F9, and was mentioned also as a minor consideration by managers from F5 and F8. All these firms are manufacturing firms and except for F5, the other four are customer facing, extrovert firms. The discussions suggested some disconnected between the market and the firm in terms of translating the inputs received into a viable product. These firms experienced some increases in frequencies of management intervention, greater headquarter control, and lesser subsidiary autonomy. Additional layers of inefficient institutions and ecosystem intricacies work to compound the overall inefficiency of the offshore function. These combine to cause potential confidence challenges which lead to less critical and more routine and easily replicable work being offloaded. This is somewhat detrimental to the progression of innovation value delivery.

The second part is why the decision makers offshored what they perceive to be R&D functions. 8 of the firms discussed have an R&D unit, lab, or centre in India and are performing some form of research and development activities in their Indian facility. Of the other 2, F7 performs only ad-hoc R&D in India, while F10 re-shored its R&D back to Sweden. However, what constitutes R&D varies depending on how decision

makers within the firm view this function. In table 4, the numbers indicate the number of times the respective elements were discussed in each perspective of what R&D is. These are decision makers' views of R&D in their firms and are not necessarily an academic or industry definition of what R&D means. On looking at the table, R&D as low-risk, low-tech work emerges as the most important discussion for the decision makers. As I will present later in this section, India is still relevant as a lower cost location and because innovation led R&D activities are expensive, R&D functions performed from India still tend to be of a somewhat lower specification. This is especially true for manufacturing firms, as can be seen from the table. This could also be because decision makers from manufacturing firms talk about R&D as a product simplification exercise. These together lead to the development of simpler products and the offshore work is possibly of lower technology or functionality levels. Manufacturing firms also have a case for local adaptations which means they adjust their products to fit the specific needs of the market.

Table 4: What do decision makers mean by R&D?[4]

FIRM	TYPE	Standard product	Product simplification	Low-risk, low-tech work	Support functions	Product development
F1	SM	0	1	4	2	2
F2	ST	2	0	0	0	1
F3	ST	0	0	0	0	3
F4	LM	1	2	7	2	2
F5	SM	1	0	8	1	5
F6	LT	0	0	3	0	4
F7	ST	2	0	0	3	0
F8	LM	0	4	1	3	2
F9	LM	0	0	8	8	3
F10	SM	0	0	0	1	2
		6	7	31	20	24

This is manifested in their view of what R&D is in their firm and is shown in table 35. For firms F2, F3, F7, and F10, the low-tech and product simplification activities of R&D are not discussed at all. These 4 firms are all small firms and are essentially performing activities for regular product development or support functions for global R&D centres. F2, F3, and F7 are technology firms, in which product simplification activities are generally not very significant because they tend to have a standard, global product which is essentially the same worldwide.

Why the decision makers decided to offshore the above discussed R&D functions is explained in the paragraphs that follow. This again shows the views of the decision makers and the summary of this discussion is presented in table 5.

[4] Type: 'S' means Small firm, 'L' means Large firm, 'M' means it is in the Manufacturing sector, 'T' means it is in the Technology sector. So, Type 'ST' indicates a **Small** firm in the **Technology** sector.

Table 5: Decision makers' motivations to offshore R&D

		TRADITIONAL			PROXIMITY		STRATEGIC		COMPETITIVE	
FIRM	TYPE	Low cost	Resource availability	Location advantage	Close to market	Close to production	Modernise industry	Emerging market	Market size	Opportunity cost
F1	SM	4	2	0	3	0	0	0	1	3
F2	ST	0	0	0	0	0	1	0	2	1
F3	ST	1	2	2	0	0	0	0	0	0
F4	LM	5	3	1	6	0	0	3	4	3
F5	SM	5	5	2	2	2	0	4	1	1
F6	LT	4	5	2	1	0	0	0	0	1
F7	ST	0	0	2	0	0	0	0	2	1
F8	LM	2	2	2	3	0	0	3	1	2
F9	LM	6	7	4	1	3	0	0	0	0
F10	SM	0	0	0	1	1	0	0	2	2
		27	**26**	**15**	**17**	**6**	**1**	**10**	**13**	**14**

From the table it is clear that the traditional reasons for offshoring – low cost and skills – are still the most discussed, and more so for manufacturing firms. Although the labour costs in India have increased tremendously over the last few decades it still is attractive enough as a primary driver for finding large numbers of skilled resources at competitive prices. This is especially relevant in R&D because R&D engineering and scientists skills are even more expensive elsewhere than they are in India. Lowering the cost of R&D and its appropriation is important for the firms that chose to open an R&D centre in India. It is interesting to note, however, that for three firms – F2, F7, and F10 – low cost and skills volume were not discussed at all as R&D offshoring drivers. As we saw earlier in this study, these are firms most closely configured to perform innovation led R&D. These firms essentially sought competitive drivers of market size and opportunity cost as major motivations for R&D in India. These three are also all small firms and from the offshore R&D configuration model I presented earlier we can see that smaller firms have moved towards innovation led configurations and away from cost and quality centred dynamics.

Decision makers in production firms deem it important to locate their R&D close to the market and to the production, while these are not so important for decision makers from technology firms. This difference could be because decision makers from production firms use the information they receive from the market to work on relevant products so proximity to the market is more significant for them. For technology firms, market information other than market size is not so important. The 'need' to be in an emerging market and the 'fear' of missing the opportunity are discussions that resonate among decision makers across almost all the firms irrespective of firm size and industry ownership.

Conclusion

The current theories of decision quality and decision support explain the effects of exogenous and endogenous factors, and individual and cognitive factors on decision quality. Depending on the decision-maker quality, decision quality may improve or degrade when information quality improves (Raghunathan, 1999) and the outcome is dependent on both the environment (exogenous factors) as well as the decision maker's choices (endogenous factors) (Davern et al., 2008). According to Davis & Kottemann (1994), users

overestimated their own performance when the environment factors matched their views of the problem. These are experience and confirmation factors that influence a manager's decisions. Such manager held views arise from their own individual expertise and the environment the manager is in.

I can sum up the offshore decision criteria as a set of decisions that arise from a collection of views. In this study two different sets of views are explored and decisions arise for these two intertwining sets of opinions. These are the manager held views and a collective firm view of what offshoring of innovation is. A manager performs a certain role within the organisation, which in the context of this study is either in management or in technology, and is a citizen of either India or Sweden. These two together form a sort of a manager grouping and leads to a views which, for certain themes, appears to diverge somewhat from other managers within the same firm while converging across firms with managers in the same role and having the same nationality. This happens because the motivations of belonging to one group are different from those who belong to another group. Even within the same firm, what a manager who is Indian and works in India might see benefits and challenges associated with offshoring innovation differently than a manager who is Swedish. This is not a difference we can necessarily attribute to culture, but it is rather a difference if views based on what a manager sees (and often assumes) from his or her professional experience and implicit knowledge of the local environment. Managers attribute different importance to the same criteria depending on where they are from and this leads to a different choice in recommendations. This is also true for managers who are in different roles. A manager in a technology function views innovation offshoring quite differently from a manager who is in the management function. They also attach different importance to the same things, perceive different challenges, and are possibly driven by different potential outcomes. The two functions may also view innovation differently and that happens because the technology function is 'closer' to the innovation activities than the management function is. This leads to managers in technology functions possibly expressing similar thoughts across firms and the same is true for management employees. We can see from the study results that manager views converge across firms for the same functions. So, from the results of the study, I propose that:

> *Proposition 1a: The viewpoints of decision makers may converge across firms and diverge within firms, depending on whether they are in the technology or management roles and whether they are home or host country nationals.*

> *Proposition 1b: The viewpoints of decision makers may converge across firms depending on the whether the firm is small or large and whether it belongs to the manufacturing or the technology industry.*

The discussion in this study results in a contribution to decision quality that is applied specifically to the offshoring of innovation. There aren't many suggestions developed that consider both pre-event and post-event individual, firm and environment factors affecting decisions. Before the decision to establish an R&D centre offshore there are several considerations for the decision making managers. These are the stimulators or accelerating factors which work towards legitimising or justifying a manager's decision choice. These factors come from a manager's experience, from the firm's experience, goals, and strategy, and from competition and the environment. Managers use this information to arrive at the choices leading to the offshoring. How well they utilise the available information is an important precursor to the type of innovation established offshore. When the offshore R&D centre has been established there is then another set of factors that affect the progress of innovation offshore. These are hindering or inhibiting factors and are, what

I called, decelerators. As with accelerators, these are individual level, firm level, competitive, and environment factors. Managers interpret these factors differently and this also results in different ways innovation has currently been established for a particular firm. How these decelerators are managed will result in different outcomes to the progress of innovation. In the most extreme case discussed firm F10 which had established R&D centre with an innovation-led configuration had to close its centre and re-shore to Sweden because of very strong decelerating factors that proved unable to manage or to minimise. This is indicative of the quality of the decision making that did not consider fully the magnitude of the negative effect of the inhibiting factors. Decision quality is assessed by considering both the pre-event criteria and the post-event criteria and can be affected by maximising the knowledge gained from the pre-event accelerating determinants and minimising the influencing effects of the post-event decelerating determinants. The stimulating factors are decision triggers based on forecasts, trends, and experience while inhibiting factors are based on actual results and are ex-post and post-hoc. The conclusion drawn thus leads to the suggestion that:

> *Proposition 2: The set-up of the offshore R&D and the resultant innovation outcome are affected by accelerators and decelerators.*

Building an understanding of how managers view their own firms and its activities, and how they make offshoring decisions basing their judgement on the existing traditional knowledge about the phenomenon and individual or collective experiences or motivations, will advance the theory of decision making in innovation studies from a manager's viewpoint and furthers the knowledge in strategic management. It will make for an interesting future research study if we can explore how various decision making methods and tools affect the quality of decision making and outcomes, and how important a role individual and firm level biases play when such methods are used.

References

Brim, O. G. 1962. ***Personality and decision processes: Studies in the social psychology of thinking***Stanford University Press.

Brunsson, N. 1982. The irrationality of action and action rationality: Decisions, ideologies and organizational actions. ***Journal of management studies***, 19(1): 29-44.

Brunsson, N. 1990. Deciding for responsibility and legitimation: Alternative interpretations of organizational decision-making. ***Accounting, Organizations and Society***, 15(1): 47-59.

Brunsson, N. 1993. Ideas and actions: Justification and hypocrisy as alternatives to control. ***Accounting, Organizations and Society***, 18(6): 489-506.

Bunyaratavej, K., Doh, J., Hahn, E. D., Lewin, A. Y., & Massini, S. 2011. Conceptual issues in services offshoring research: A multidisciplinary review. ***Group & Organization Management***, 36(1): 70-102.

Davern, M. J., Mantena, R., & Stohr, E. A. 2008. Diagnosing decision quality. ***Decision Support Systems***, 45(1): 123-139.

Davis, F. D., & Kottemann, J. E. 1994. User perceptions of decision support effectiveness: Two production planning experiments. ***Decision Sciences***, 25(1): 57-76.

Dean, J. W., & Sharfman, M. P. 1996. Does decision process matter? A study of strategic decision-making effectiveness. ***Academy of management journal***, 39(2): 368-392.

Dewey, J. 1910. How we think. ***Middle Works***, 6: 177-356.

Dewey, J. 1997. ***How we think***Courier Dover Publications.

Dooley, R. S., & Fryxell, G. E. 1999. Attaining decision quality and commitment from dissent: The moderating effects of loyalty and competence in strategic decision-making teams. ***Academy of Management journal***, 42(4): 389-402.

Etzioni, A. 2014. Humble decision-making theory. ***Public Management Review***, 16(5): 611-619.

Hansson, S. O. 1994. Decision theory. ***A brief introduction.Department of Philosophy and the History of Technology.Royal Institute of Technology.Stockholm***.

Kahneman, D., & Tversky, A. 1979. Prospect theory: An analysis of decision under risk. ***Econometrica: Journal of the Econometric Society***: 263-291.

Klein, G. 2008. Naturalistic decision making. ***Human factors***, 50(3): 456-460.

Koch, C. 2013. ***Offshoring engineering-experiences of scandinavian engineering consultants***. Paper presented at Proceedings of the 19th CIB World Building Congress: Construction and Society, Queensland University of Technology. Brisbane.

Kocher, M. G., & Sutter, M. 2006. Time is money—Time pressure, incentives, and the quality of decision-making. ***Journal of Economic Behavior & Organization***, 61(3): 375-392.

Lewin, A. Y., Massini, S., & Peeters, C. 2009. Why are companies offshoring innovation? the emerging global race for talent. ***Journal of International Business Studies***, 40(6): 901-925.

Lewin, A. Y., & Peeters, C. 2006. Offshoring work: Business hype or the onset of fundamental transformation? ***Long range planning***, 39(3): 221-239.

Massini, S., & Miozzo, M. 2012. Outsourcing and offshoring of business services: Challenges to theory, management and geography of innovation. ***Regional Studies***, 46(9): 1219-1242.

Mintzberg, H., Raisinghani, D., & Theoret, A. 1976. The structure of" unstructured" decision processes. ***Administrative Science Quarterly***: 246-275.

Penrose, E. T. 1995. The theory of the growth of the firm, 1959. ***Cambridge, MA***.

Postmes, T., Spears, R., & Cihangir, S. 2001. Quality of decision making and group norms. ***Journal of personality and social psychology***, 80(6): 918.

Raghunathan, S. 1999. Impact of information quality and decision-maker quality on decision quality: A theoretical model and simulation analysis. ***Decision Support Systems***, 26(4): 275-286.

Roza, M., Van den Bosch, F. A. J., & Volberda, H. W. 2011. Offshoring strategy: Motives, functions, locations, and governance modes of small, medium-sized and large firms. ***International Business Review***, 20(3): 314-323.

Simon, H. A. 1960. The new science of management decision.

Šmite, D., & Cruzes, D. S. ***Expectations and achievements: A longitudinal study on an offshoring strategy***. Paper presented at Symposium on Empirical Software Engineering and Measurement (ESEM).

Šmite, D., Wohlin, C., Aurum, A., Jabangwe, R., & Numminen, E. 2013. Offshore insourcing in software development: Structuring the decision-making process. ***Journal of Systems and Software***, 86(4): 1054-1067.

Smith, W. K. 2014. Dynamic decision making: A model of senior leaders managing strategic paradoxes. ***Academy of Management Journal***, 57(6): 1592-1623.

Teece, D., & Pisano, G. 1994. The dynamic capabilities of firms: An introduction. ***Industrial and corporate change***, 3(3): 537-556.

Tversky, A., & Kahneman, D. 1974. Judgment under uncertainty: Heuristics and biases. ***Science (New York, N.Y.)***, 185(4157): 1124-1131.

Tversky, A., & Kahneman, D. 1981. The framing of decisions and the psychology of choice. ***Science (New York, N.Y.)***, 211(4481): 453-458.

Wernerfelt, B. 1984. A resource-based view of the firm. ***Strategic Management Journal***, 5(2): 171-180.