Week 2: Research Lifecycle

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# Research Lifecycle

Producing high-quality research is a complex undertaking that can span months or even years. Like other lengthy efforts, a formal engineering process needs to exist to provide structure around each phase. This research lifecycle follows a feedback loop consisting of Idea Curation, Data Curation, Analytical Inference, and Result Conclusions (Bukvova, 2009). Since each stage’s output becomes the next one’s input, it is critical to perform them with due diligence (see Figure 1).

Figure 1: Abstract Research Lifecycle Model

Depending on the research specific requirements, each lifecycle phase might further decompose into various child steps (Bukvova, 2009). For instance, a hundred-page dissertation requires multiple iterations of idea curation through refinement and preliminary investigation. After sufficient scoping of the problem and research questions, it becomes more manageable for Data Curation to assemble supporting evidence. This alignment of questions and facts simplifies data analysis and results in better answers (Snee, 2015). Finally, the researcher decides if the problem is sufficiently addressed or must incorporate this new knowledge into another iteration of the feedback loop.

# Theory to Practice

Using Northcentral’s library, three recent dissertations on cloud computing were selected (see Table 1). Each document implements a research lifecycle that begins with an idea, defines an experiment, and concludes with specific findings.

## Idea Curation

Despite broad agreement across the business community that cloud computing is the future, there is significant resistance toward adoption. These papers examine different aspects of risk management challenges that arise during cloud migration. For instance, Effiong (2020) and Smith (2016) consider migration delays originating from management misperceptions. Meanwhile, Kilgore (2020) performs a postmortem analysis on completed migrations. All three researchers believe businesses that operate on cloud infrastructure are more innovative and competitive. Therefore, it is critical to organizational efficiency to identify roadblocks, reduce risk, and accelerate adoption timelines.

## Data Curation and Analysis

Kilgore (2020) and Effiong (2020) chose purely qualitative methods that leverage semi-structured open-ended surveys. Next, both scholars transcribed the interviews into electronic documents and annotated them with contextual tags. These tags signify that a given sentence is describing security risk, operational overhead, or another theme. After completing the tagging process, they use the tag-frequency to determine the importance of one subject over the next. Neither author includes more advanced quantitive methods as their goal is to explore key drivers, not measure conviction strength.

Smith (2016) uses a qualitative centric mixed method that collects scaled-responses from 1 to 5 stars. Next, an aggregate of results builds into a topic graph with weighted edges. These weights represent the likelihood that a given personality trade is a primary decision driver. Smith also makes a unique decision choice to collect survey results through Amazon Mechanical Turk. While this produces 373% more responses, it brings into question the quality of those results. Perhaps cloud executives are actively perusing the service in search of surveys that pay pennies for completion, but that seems improbable.

## Result Conclusions

After transforming the data into information, all three authors summarize their findings and critical insights. Smith (2016) determines that executives are unwilling to adopt the cloud until the service providers offset their professional risk. Effiong (2020) reaffirms this by enumerating these risks and how a lack of clarity leads to analysis paralysis. Kilgore (2020) further confirms these ideas by reporting that companies finally “lept before they looked” –essentially discarding traditional enterprise risk management.

Collectively these ideas suggest businesses see cloud migration as “an art, not a science.” This perspective is unfortunate as it means many businesses are unable to access the latest technologies. Until cloud service providers reduce this barrier to entry, these ‘old guard’ companies are left performing undifferentiated heavy lifting (Jassy, 2019). For instance, customers do not choose suppliers based on their ability to rack a server or install a database product. Nevertheless, significant investments in these areas continue to be standard practice for organizations stuck in private datacenters.

# Conclusions

Any project of reasonable complexity requires a formal management process, and research is not an exception. Scholars can begin with the generic template of transforming ideas into questions, data into insights, and insights into answers. Each of these steps is independently decomposable for more granular task administration. After completing a cycle, the researcher needs to assess if the topic is sufficiently addressed or requires further inquiry.

Next, an investigation into the implementation of these research lifecycle processes took place using three dissertations. These dissertations begin with establishing the research topic and its significance then addressing those areas through qualitative analysis. Then common themes were extracted using a combination of formal decision analysis with surveys and open questions. After discovering the common knowledge gaps, they can recommend mitigations, ultimately resulting in better operational efficiency through more consistent cloud migrations.

Table 1: Dissertations Reviewed

|  |  |  |  |
| --- | --- | --- | --- |
|  | Risks During Cloud Migration | Mgmt Experiences with Cloud | Personal decision factors of IT execs |
| Author | Kilgore, N (2020) | Effiong, A (2020) | Smith, M (2016) |
| Research Problem | * What process risk exists during a cloud migration? * *How do enterprise businesses manage the risks they encounter during the migration of cloud computing* (page 4) | * Small to midsized sized organizations are adopting cloud slower than large enterprises * What misperceptions cause these delays | * Businesses want to adopt cloud but do not * What factors impede adoption rates |
| Purpose | * A qualitative study of how are businesses handling these challenges * Many businesses are failing their migration strategies | * Explore the lived experiences to understand their perceptions * Produce targeted evidence that mitigates concerns in cloud models | * Identify personal decision factors that delay migrations * Are executive desires for superiority negatively impacting timelines |
| Methodology | * Decision Theory * Interview questions * Purely qualitative (no hard numbers available) | * Watson’s concept of resistance to change * User acceptance theory | * Define a 24 question survey * Send to 556 executives * Review the 232 responses |
| Design of Study | 1. Select participants from    1. Mid-sized enterprises    2. Migrated last 5-years    3. Materially involved 2. Limit to 7 organizations randomly selected 3. Structured Interview 4. Theme extraction | 1. Select participants    1. Northeast US    2. Businesses less than 100    3. 12 male + 4 female managers 2. Arranged face-to-face interviews | * Send the survey through Linkedin with a request to forward * Collected results then aggregate into Technology, org, and environment framework (TOE) * Examines three areas of incentives, fears, org design |
| Instruments | * Structured interview from credible sources * Three sets of questions   + Demographic (closed)   + Eligibility (open)   + Research Topic (semi-structured) * *The interviewer is the real instrument* (page 73) | * Structured interviews * Two sets of questions   + Demographics (closed)   + General cloud perception (open) * Use NVivo 12 to perform trend analysis on the interview transcripts * *The researcher is the primary instrument* (page 65) | * The primary instrument is the researcher * Distribute the surveys through LinkedIn (49), Mechanical Turk (183) * SurveyMonkey for initial aggregation and insights |
| Analysis | * Anonymize data * Annotate the sentences with tags * Aggregation and theme extraction | * Create targeted open-ended questions * Review the relevance with a test panel * Interview leaders until data saturation occur * Feed transcripts into NVIO | * The survey includes sections on Demographics, business role, industry * Questions are scaled 1-5 * Responses aggregate into a topic graph model * Edge weight is calibrated based on the frequency * Strength of edge tests 7-hypothesis |
| Findings | * Businesses did not manage migration risk * Focus on less complicated risks * Use of external vendors for risk management * Completion time was vital to plan * No formal risk documentation | * Actualized experiences were generally positive * Perception is the risks come from Training, Flexibility, Efficiency, Costing, Ease of use, Security * Reviewing business processes can highlight these risks already exist in private data centers | * Executives minimize personal risk and maximize the perceived value * Cloud vendors need to demonstrate how to realize outcomes and offset sponsorship risk clearly |

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