Assessing Knowledge Loss Risk

Murray E. Jennex
San Diego State University
mjennex@mail.sdsu.edu

Alexandra Durcikova
University of Oklahoma
alex@ou.edu

Abstract
Knowledge has been recognized as a critical asset for companies that want to compete in today’s turbulent business environment. Researchers and practitioners recognize that the loss of knowledge due to loss of employees that hold valuable knowledge can have grave consequences to an organization. This paper provides a methodology for assessing potential risk of losing knowledge when employees retire or otherwise leave the organization based on the traditional risk calculation that is compensated for the quality of knowledge to be lost. This paper tests a method for scoring each factor in the risk calculation and then assessing the criticality of the risk based on the final calculated score and pilot tests this approach with 85 subjects. A discussion is provided on actions that organizations should take based on the criticality of the risk associate with knowledge loss.

1. Introduction
By 2010, more than 25% of the entire workforce reached retirement age. This would have resulted in a potential worker shortage of 10 million and a tremendous loss of organizational knowledge had not the world economy went into recession [1]. Organizational knowledge loss is an unfortunate fact and one that will become a large problem for organizations as the economy improves. We already see signs of this knowledge loss problem with companies such as NASA [2], BP [3], or a soil oil producing company [4], to name a few. Organizations lose knowledge through the loss of knowledge holders (i.e., experts and knowledge workers), failure to capture critical knowledge, failure of knowledge repositories (this can be failure of electronic, paper, or human storage media), and just plain forgetting (either forgetting the actual knowledge or forgetting where captured knowledge is stored) [5, 6]. Both researchers and practitioners recognize that knowledge loss represents a risk, and there have been efforts to calculate knowledge loss risk [7], however these efforts have focused on assessing position knowledge, not individual knowledge. Thus, there is a need to explore how to formally assess the risk of losing knowledge by losing experts. The purpose of this paper is to test the methodology proposed by one of the authors (currently under review) and offer organizations a formal way to assess the risk of knowledge loss if their employees leave.

This paper is structured as follows: First, we describe what risk is for knowledge loss and define the factors that determine it. Next, we define the process for determining values for each knowledge loss risk factor and define the process for ranking knowledge loss risk so that steps can be taken to mitigate it. Finally, we pilot test this approach with employees working at a variety of organizations and conclude with our finding.

2. Theoretical background
In this paper, we employ an engineering approach to define risk and how to quantify it with respect to knowledge loss. The National Institute of Standards and Technology (NIST), defines risk as the net negative impact of the exercise of a vulnerability, considering both the probability and the impact of occurrence. Risk is traditionally represented by the formula:
\[ R_{risk} = p(\text{probability of occurrence}) \times C(\text{consequence of occurrence}) \]

Risk management is the process of identifying risk, assessing risk, and taking steps to manage risk by reducing risks to an acceptable level [8]. There are two ways how researchers and practitioners look at risk. First, Smith et al. [9] and Aubert et al. [10] argue that IS managers and researchers traditionally define risk in terms of negative consequences describing risk as the possibility of loss or damage and the possibility of suffering harm or loss. Second, Billington [11] points out that, when examined closely, ‘risk’ can actually lead to both positive and/or negative consequences. In any particular initiative the risks involved could represent different
meaning to an organization. Billington [11] recognizes that risk is hazard must be minimized or eliminated and that the direction that should be taken to eliminate is must be studied so that there is a minimal difference between anticipated outcomes and actual results. However, Billington also stresses that risk represents a growth opportunity which must be assessed to determine how much innovation, initiative, and entrepreneurship, should be exercised.

Viewing risk as something more than a hazard is highly applicable to risk management in KM. Although knowledge loss risks can lead to negative results, if the right strategy is applied to eliminate them they can also represent significant opportunities for savings or business development. While uncertainty associated with knowledge use, be it due to rapidly changing technology and storage media, to misuse or new and unexpected uses of knowledge, or to the basic understanding of the captured knowledge is one of the biggest challenges a KM manager faces, this paper focuses on the risk of knowledge loss from a human source. Therefore, we define knowledge loss risk as the expected impact to the organization resulting from the loss of a particular expert or knowledge worker. This is consistent with the NIST risk definition and therefore the NIST risk algorithm is used as the basis for determining knowledge loss risk. Building on Billington [11], we see knowledge loss as a risk. To find the appropriate action that needs to be taken to eliminate this risk, we need to create a methodology to assess the knowledge loss risk.

2.1 Current approaches to knowledge loss risk

The nuclear industry has been conducting research into knowledge loss due to its aging workforce. This industry in particular suffers from knowledge loss because only few new nuclear plants have been built in the last 20 years thus making this a less attractive career for young engineers and other knowledge workers. The International Atomic Energy Agency (IAEA) has led research into methods to mitigate knowledge loss from retiring workers [7]. The suggested process is diagrammed in Figure 1 and is consistent with traditional risk assessment processes. After rating the risk the process uses interviews to determine the scope of knowledge to be captured and the actions that should be taken to capture this knowledge. The third step periodically monitors the knowledge retention program for compliance and effectiveness. This process has been successfully implemented at the Tennessee Valley Authority, TVA, public utility (7, 12], at Duke Energy [13], and successfully adapted at the Michigan Department of Agriculture has adapted the process for its own use [14].

Other approaches include Kaplan [15] who proposed using communities of practice, knowledge repositories, and mentoring and intern programs to assist the procurement industry in transferring knowledge from retiring workers to replacements. Parise et al. [16] argued using organizational network analysis to also assess the impact of the loss of knowledge in a departing employee has on their work network. Their approach considered two network roles as crucial roles requiring actions for capturing knowledge: (1) central connector (employees with technical expertise and organizational memory as well as a set of relationships that help many others get information or other resources to do their work); and (2) broker (broad knowledge of how the organization operates and ability to recognize and take advantage of opportunities that require integration of disparate expertise). Massingham [17] supports the need for social network analysis as it was found that while loss of a critical employee may impact the social network by causing a loss of knowledge, it may also be mitigated because much of the knowledge possessed by the critical employee was distributed throughout their social network. Only by performing a social network analysis will the organization know which case (knowledge loss or loss mitigation) exists.

![Figure 1 IAEA Knowledge Loss Risk Assessment Process (Kosilov, Mazour, and Yanev, 2006, p.7)](image-url)

While retirement is the most immediate contributor to knowledge loss, other factors, in particular job mobility, are major continuing contributors requiring a process to capture critical knowledge [16]. Additionally, Deloitte and Touche
[18] found that 69% of the 1396 human resources practitioners surveyed said attracting new talent poses the greatest threat to competitiveness, followed by the inability to retain key talent (66%) and incoming workers with inadequate skills (34%). However, Parise et al. [16] report that only half of the above surveyed organizations had identified a list of critical skills needed for future growth and more than one-quarter viewed defining critical skills as unimportant. The key problem with many retention approaches is that they capture only a small fragment of what made an individual successful and knowledgeable [19], while forgetting that just because knowledge has been captured and stored in a database or a process manual does not mean it will ever be found, correctly interpreted, or given enough credibility to be used outside of the expert that authored it. Therefore, retention approaches focus too heavily on a person’s knowledge independent of the network of relationships critical to getting work done.

Knowledge loss from losing an employee has three impacts [17]: (1) loss of contribution to the organizational memory; (2) loss of relational knowledge with the internal and external social network (fellow employees and customers); and (3) loss of work performance resulting in decreased organizational productivity (there is a decrease in the organization’s ability to perform the tasks it performed before the employee left). In other words, a lost employee results in lost know-how, know-who, know-what [20].

The above suggests that a knowledge retention program needs to focus on more than just retirees; it needs to also consider employee mobility while investigating the impact of knowledge loss within the social network of the organization. Also, more than just the position of the employee in the network should be investigated and focus should be on what the employee truly knows as judged by their experiences, the projects they have worked on, the social network they interact with, and the tasks they have performed based on their skill set. Thus, while the nuclear knowledge loss assessment process does provide a starting point for knowledge loss assessment it does not appear to be adequate for every industry. The proposed methodology addresses these weaknesses by expanding the evaluation criteria to include looking at these areas and by incorporating an assessment of the social network.

An additional weakness of the nuclear knowledge loss assessment process is that it doesn’t provide enough differentiation between employees by only using a 25 point rating system. In a static organization (low turnover) such as nuclear utilities where there is one product in one technical domain this may be adequate. In dynamic organizations with regular turnover that produce a variety of products and services in a number of different technical domains, this is not adequate. The newly proposed 1000 point scoring system is an attempt to provide greater differentiation between assessed subjects. The goal is to provide clearer indication of the truly critical knowledge source employees so that an organization’s limited resources can be more effectively utilized in capturing and transferring critical knowledge. Additionally, the use of a knowledge source quality factor is specifically added to help differentiate between knowledge sources with like experience.

2.2. Proposed Approach

The basic approach being proposed is similar to the process in Figure 1 but has the key difference of focusing on assessing knowledge loss at the individual level rather than at the position level. This difference is necessary due to most organizations having a project/product/service focus rather than the nuclear industry’s focus on systems. A focus on projects, products, and services causes individual experience to vary widely making it more important to assess the individual rather than the position. The basic steps are as follows:

First, use the subject’s personnel file and resume in conjunction with a capability catalog or other organizational document listing key skills, capabilities, or knowledge critical to the organization to establish initial ratings for the consequence and probability of knowledge loss (ratings are discussed below).

Second, determine the level of mitigating actions to be taken (process discussed below).

Third, for urgent and high priority subjects conduct follow up interviews to refine the risk assessment and to identify specific knowledge to be captured.

Fourth, for urgent and high priority subjects conduct an organizational network analysis to determine those impacted by the subject in the flow and utilization of critical knowledge.

Fifth, generate a knowledge retention plan (discussed below).

Finally, monitor implementation of the knowledge retention plans and risk assessment process for overall effectiveness.

Note that this paper focuses on assessing the risk of knowledge loss through the loss of human knowledge sources. Rather than quantifying risk (what is difficult), this paper is proposing a methodology for ranking and rating risk so that managers can determine what risks to address first. This is an acceptable alternative per Stoneburner, et
al. [8] and one that will achieve the goal of determining what knowledge sources need to be managed to minimize the impact of knowledge loss. The approach uses the following risk algorithm:

\[ R(\text{knowledge loss}) = P(\text{loss of human knowledge source}) \times C(\text{loss of perfect human knowledge source}) \times Q(\text{quality of human knowledge source}) \]

Additionally, it incorporates processes for rating: (1) likelihood of the loss of a human knowledge source either through retirement or attrition, (2) consequence of the knowledge loss given a perfect knowledge source, and (3) quality of the knowledge source. In conclusion, this technique allows us to rank knowledge loss risk and determine appropriate course of action to mitigate it. The next section describes the methodology in more detail.

**Knowledge Loss Risk.** Knowledge loss risk is the impact to the organization caused by the loss of a human knowledge source, usually an expert, a knowledge worker, or a manager. This impact is assumed to be negative since many organizations view knowledge as their key asset and loss of knowledge would be expected to lower the value of this key asset. Knowledge loss risks will be classified into three categories:

- Immediate action required to capture critical knowledge
- Planned action required to capture critical and/or important knowledge
- No special action required to capture knowledge

**Probability of Knowledge Loss.** The probability of knowledge loss factor rates the likelihood of a human knowledge source being lost to the organization. Loss of human knowledge sources occurs in several ways, for example, retirement, turnover, disability, or job change (within the same company). Factors that influence probability of knowledge loss include age, health, uniqueness of skills and knowledge, demand for skills and knowledge, and years of service. While age is a general indicator of experience and a strong predictor of retirement, health is a relatively unpredictable factor. Uniqueness of skills creates a demand for knowledge that can start at any age and which may grow or shrink as age increases. Generally, the more unique and newer the skill the greater the likelihood demand will grow. Demand for skills and knowledge reflects market needs outside of the organization for specific knowledge which can increase or decrease mobility of the possessor. Finally, years of service indicates an ability to stay with a job or project and reflects experience and responsibility. Generally low and high level of years of experience is detrimental to movement while moderate years of service increase the likelihood of movement. This is generally reflected in many industries (such as the military) in the recruitment of large numbers of entry level positions with rewards given for retention until the source hits the certain years of service (in the military this is generally assumed to be approximately 8 to 10) where the cost of changing positions (such as loss of vacation, retirement benefits, etc.) outweighs whatever benefits can be gained (such as increased salary, change in job responsibilities, change in location).

The above factors can be combined into overall probability profiles and ranked and rated for most likely to least likely. To generate an overall risk score a single value must be generated. Probability of knowledge loss will be valued using the following 10 point scale (pick the highest score that applies to the subject):

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Employee is definitely at risk of leaving (examples: is of retirement age, is being terminated or laid off, or has been diagnosed with severe or possibly fatal illness)</td>
</tr>
<tr>
<td>9</td>
<td>Employee is considered young, mobile, and in demand (example: has 5 or more years experience, is less than 45, and possess knowledge/skills that are in demand)</td>
</tr>
<tr>
<td>8</td>
<td>Employee is considered an expert that may be getting bored or who has to travel frequently (example: has 15 or more years of experience and travels 4 or more times a year, or was hired as an expert and has 5 or more years of experience)</td>
</tr>
<tr>
<td>7</td>
<td>Employee is experiencing a forced change in position/career (example: working on a project/product/service that is being phased out)</td>
</tr>
<tr>
<td>6</td>
<td>Employee has a history of changing companies (example: is under 40 and has worked for 3 or more companies)</td>
</tr>
<tr>
<td>5</td>
<td>Employee is young (example: is under 30)</td>
</tr>
<tr>
<td>4</td>
<td>Employee travels frequently (example: employee has 6 or more business trips in the last year)</td>
</tr>
<tr>
<td>3</td>
<td>Employee is in a leadership position (example: employee is a manager, supervisor, project manager, etc.)</td>
</tr>
<tr>
<td>2</td>
<td>Employee has many years of experience (example: employee has more than 20 years of experience)</td>
</tr>
</tbody>
</table>
2.1 Consequence of Knowledge Loss

The consequence of knowledge loss factor rates the likely impact of losing a human knowledge source to the organization. Factors that impact the consequence of a loss of human knowledge sources include:

- Criticality to Competitive Advantage – source possesses knowledge of processes, products, or services that are critical to current company earnings and/or maintaining/increasing market share
- Key skill – source possesses knowledge of a skill that is essential to maintaining current products/services or needed to create new products/services
- Key experience – source possesses knowledge through participation or observation of key experiences in company history, these experiences generally led to company learning associated with key events, initiatives, products, services, etc.
- Key contributor – source possesses unique knowledge due to their role in key company events, initiatives, and/or product/service development and/or delivery

There are two factors that influence the overall consequence of knowledge loss: ease of replacement and numbers of sources possessing the knowledge:

- Ease of replacement looks at the availability of like qualified knowledge sources that can be quickly brought into replace the lost source. Generally the more possible replacements the less impact the loss has, additionally, if given time and a replacement can be brought in before the source is lost then impact is significantly mitigated.
- Numbers of sources possessing the knowledge assesses if there are others possessing the knowledge within the organization with the expectation being that the more there are who possess the knowledge the lesser the impact of losing the knowledge source. The converse is also true, the more unique the source, the greater the impact. The caveat to this factor is that it may take significant analysis to determine the uniqueness of the source.

The above factors can be combined into overall consequence profiles and ranked and rated for most severe to least severe. To generate an overall risk score a single value must be generated. Consequence of knowledge loss will be valued using a 10 point scale as shown in Table 2.

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Employee is a key contributor to the organization that has no like replacement available (examples include: possesses unique knowledge that contributes to organizational competitive advantage or has unique critical skills, knowledge, and/or experience)</td>
</tr>
<tr>
<td>9</td>
<td>Employee is a key contributor to the organization that has a like replacement but not before they are lost (examples are the same as above)</td>
</tr>
<tr>
<td>8</td>
<td>Employee is a key contributor to the organization that has a like replacement that is available before they leave (examples are same as above)</td>
</tr>
<tr>
<td>7</td>
<td>Employee is a key contributor to the organization that has a few like replacements that are available before loss of the source (examples are same as above)</td>
</tr>
<tr>
<td>6</td>
<td>Employee is a key contributor to the organizations that has many like replacements that are available before loss of the source (examples are same as above)</td>
</tr>
<tr>
<td>5</td>
<td>Employee possesses knowledge of key events, initiatives, and/or projects, or has been a manager or key contributor for products and/or services still offered by the organization</td>
</tr>
<tr>
<td>4</td>
<td>Employee possesses a skill in demand by the organization</td>
</tr>
<tr>
<td>3</td>
<td>Employee has spent 20 or more years at the organization</td>
</tr>
<tr>
<td>2</td>
<td>Employee has 5-20 years at the organization</td>
</tr>
<tr>
<td>1</td>
<td>None of the above apply</td>
</tr>
</tbody>
</table>

Table 2 Consequence of Knowledge Loss Values

Knowledge in the above table can be defined in multiple ways. First, knowledge can refer to an understanding of concepts or technologies utilized in products or services and are analogous to being a
2.3 Quality of Knowledge Source

The quality of knowledge source factor takes into account variables that impact the ability to capture knowledge but which are not reflected in the probability or consequence factors. The purpose of this factor is to aid in differentiating between potential knowledge losses where mitigation actions are more likely to be successful and those that are not. These include time to loss of knowledge source, current health of the knowledge source, time since knowledge was acquired by the source, ability/willingness to share knowledge, reason for leaving the organization:

- Time to loss of knowledge source recognizes the “retired on duty” syndrome and that the closer the departure date the less likely the source is to discuss events, initiatives, products, services, etc.
- Current health of the knowledge source recognizes that the source may not be in a condition to assist with knowledge capture activities. Examples include cancer treatment (ethically bad as it conveys negative thoughts at a time when the source may be fight for their life), disabilities limiting the source’s ability to participate (coma, broken bones, crippling diseases, etc.), death, etc.
- Time since knowledge source acquired knowledge recognizes that memories fade affecting the accuracy of recalled knowledge.
- Ability/willingness to share reflects that some sources may not want to participate or may participate grudgingly.
- Reason for leaving the organization recognizes that there may be emotional or legal issues affecting the ability of the source to participate in knowledge capture.

While the above factors can be combined into overall quality profiles, the number of profiles is potentially quite large. Additionally, some of the profiles indicate knowledge capture processes involving the source are not possible. The approach taken for this factor is to assume all knowledge sources start with a quality of knowledge source value of 10 with the below analysis used to compensate this value (i.e. deductions may come from several factors).

Time to loss of knowledge source, deduct as follows:
- One point if within 2 years to loss
- Two points if within 1 year of loss
- Three points if within one month of loss

Current health of knowledge source, deduct as follows:
- One point if loss of source is due to health problems in the family
- Two points if loss of source is due to disability
- Note that death, terminal illness, or a disability that renders the source unable to participate do not have deductions, however, it is assumed that knowledge capture activities involving the source are not possible and special actions (capturing email, computer contents, files, etc.) should be taken instead.

Time since knowledge source acquired knowledge, deduct as follows:
- No deduction if knowledge needing to be captured is from current position or within the last year
- One point if knowledge being captured is over 2 years old
- Two points if knowledge being captured is over 5 years old
- Three points if knowledge being captured is over 10 years old

Ability/willingness to share deduct as follows:
- One point if the knowledge source has a hard time expressing themselves or expresses concerns about being interviewed
- Two points if the knowledge source is reluctant to participate or is continuously having trouble making time for interviews
- No deduction if knowledge source refuses to participate, however, special actions (capturing email, computer contents, files, etc.) should be taken instead.

Additionally, ability/willingness to share can be assessed or the deductions mitigated through a preliminary social network analysis:
- Add two points if the knowledge source is an active participant in one or more internal community of practice and external professional or social organizations.

Participation can be judged based on postings, presentation of papers or talks, replies to emails, phone calls, etc.
• Add one point if the knowledge source is an active participant in a community of practice or a professional organization.

• Deduct one point if the knowledge source willingly participates in the interview but is not an active participant in communities of practice or professional organizations.

Membership in communities of practice and professional organizations can be determined via resume review. Amount of participation can be determined based on a combination of resume review (for papers or brown bag presentations made) and an analysis of postings or communications.

Reason for leaving the organization, deduct as follows:

• No deduction if leaving voluntarily under good terms (manager would rehire) or retiring at 62 or older

• One point if leaving due to issues with manager or coworkers

• Two points if leaving because of poor reviews, lack of promotion, or poor job fit

• No deduction if leaving due to being terminated, however, special actions (capturing email, computer contents, files, etc.) should be taken instead.

2.4 Ranking Knowledge Loss Risks

Once values have been determined for each of the factors in the below algorithm, a knowledge risk value can be calculated that will be between 1 and 1000.

The approach uses the following risk algorithm:

\[ R_{\text{knowledge loss}} = P_{\text{loss of human knowledge source}} \times C_{\text{loss of perfect human knowledge source}} \times Q_{\text{quality of human knowledge source}} \]

The higher the knowledge loss risk value, the higher the priority for mitigating the risk and this value can be used to rank all knowledge loss risks.

2.5 Determining Appropriate Courses of Action

While the knowledge loss risk value can be used to rank risk, it is not really the intent of the knowledge loss risk value. This process is designed to assist in performing steps 2-5 of the knowledge retention process and it is expected that users of this process will use the results to prioritize who to focus on for the remaining steps of the knowledge retention process. The more important use of the value is to classify the risk into knowledge capture action categories (see Table 3).

3. Research methodology and findings

Eighty five MBA students were solicited to participate to pilot test the proposed methodology for assessing knowledge loss risk. MBA students were chosen because most were working full time and thus represented the target population for this study. They were offered extra credit for participation.

Subjects were given a set of forms to complete, the forms were taken from the original study (under review and due to page constrains can be obtained from the authors) and their final score for knowledge loss was calculated based on the formula introduced in section 2.4. Additionally an item was added for the respondent to self-assess the importance of their knowledge. This item was used as a check to the form score. We also asked the subjects include their resume with their response as a secondary source to determine knowledge loss risk.

Fifty (50) usable responses were collected. All responses were scored one of the authors who were also the original scorer for the initial pilot project. This was done to limit evaluation bias/error.

The average age of subjects was 29 (st. dev 0.71), with the range of 23 to 39. 60% were males. The risk value ranged from 40 points to 900 points, with an average of 592 points and median of 630. Sixty nine percent (69%) of the subjects had a high knowledge loss probability (9 or 10 score). Thus this reflects that most of the subjects were young professionals who have critical skills needed by their organizations. The high score reflects their mobility and in particular their ability to easily change jobs once they complete their degree. The process does not call out specifically being a graduate student as criteria for high loss probability but does incorporate this heuristic in its combination of age with critical skill criteria. Interestingly, the older the subject the higher the score for knowledge loss risk. This does not show a bias against the younger, but rather indicates that the longer a person is with an organization the more skilled he/she becomes and thus has a higher risk of knowledge loss. Finally, the distribution of action to take is about the same for the genders, thus no gender bias is introduced with the proposed process.

The data indicated that some of the subjects had high risk numbers requiring urgent action. This reflects that these subjects were already important and were using their degree to potentially change jobs (this was actually indicated in some of these responses). Conversely, some of the subjects
Risk Value | Knowledge Capture Action Category
--- | ---
>=700 | Urgent/immediate action category. Critical knowledge loss is imminent. Implement the Knowledge Retention Process immediately. Consider high priority scheduling of time and resources to pursue video interviewing, preserve knowledge artifacts such as email and computer and paper files using the source to help organize them into topics. If possible and with source’s consent incorporate into an active knowledge contact bank.

300 to 699 | High priority action category. Critical knowledge loss is likely but there is time to plan for an orderly knowledge capture process. Schedule implementation of the Knowledge Retention Process when convenient. Consider finding or hiring like replacements so they are available and allow for sufficient time to conduct a turnover with source and replacement should the source decide to leave. Encourage the source to organize their knowledge into topics and capturing critical artifacts. Video interview as necessary to capture oral history before memories fade. As deemed appropriate and with the source’s consent incorporate into an active knowledge contact bank.

<300 | Low priority action category. No foreseen loss of critical knowledge, work with source to capture and organize knowledge artifacts. Conduct exit interview within one month (if possible) of leaving to capture unexpected knowledge. Maintain contact information for future contact if needed.

Special Cases | This is the preserve knowledge artifact category. Actions are taken to preserve paper and computer files and capture email. Analysis and organization on these artifacts are performed by HR with assistance from the replacement if appropriate and knowledge engineering.

Table 3 Knowledge Capture Action Determination

required no action because of they had used their undergraduate degrees to change or gain new jobs and so had little to no work experience in their new companies. Finally, four of the older, more experienced respondents were given low loss probabilities. This was for a couple of reasons that may require the creation of additional heuristics for the loss probability rating table. The first is that two were mid-level military officers having over 10 years of service. The general rule is that once you hit the 10 year mark in a military career you tend to stay till you hit retirement based on 20 years of service. The second is from a respondent who earned their undergraduate degree at an advanced age in order to get a better job. This had happened recently so the loss probability was low but because of the experience level it may require re-thinking on the job service time heuristic when the subject is in their prime work years of 30-50. Finally, one respondent was earning an advanced degree to enhance his job as a consultant and had no plans to change position. This suggests the possible need for a heuristic that addresses the purpose for earning an advanced degree.

4. Discussion and conclusion

The purpose of this research was to pilot test the methodology for knowledge loss risk as defined in Jennex [21] that uses an engineering approach to define knowledge loss risk. This study had originally created the methodology for a specific organization where it was shown to work. However, the methodology had not been tried in other organizations suggesting there was a generalizability limitation. This pilot data collection was conducted over approximately 50 organizations and showed that this methodology can be applied to any organization and allow that organization to assess knowledge loss risk. To our knowledge, this is the first study that tries to assess knowledge loss risk focusing on the general population of employees within their social network using a 1000 point scoring system that provides greater differentiation between assessed employees. It is concluded that the methodology works and can be applied in any organization. However, there are observations that suggest future research that is needed to improve the methodology. These areas are discussed as follows.

First, one of the limitations of this study was that the oldest person that participated was only 39 years old. Even though this process was designed for more tenured employees it works well for all age categories. However, future research should include a broader range of ages. Also, special focus should be paid to industries where retirement or leaving a job is more predictable. An example would be military. Once a military person hits the 10 year mark the probability of leaving decreases dramatically until they hit the 20 year mark. The probability of leaving is very high from the 4 to 8 year mark but we could
be safe to say less than 10 years but greater than 4 (the exception is disability). Therefore, new version of this scoring process should include criteria for incorporating organizations similar to military.

Second, some people may not disclose their intention to leave a company before they have to give their two week notice. Future research needs to investigate whether it is better for an organization to try to encourage employees to announce that they are leaving as soon as possible so that their knowledge could be captured or should we just acknowledge this as a practice and hope this process helps identify them early enough for normal KM practices to work in capturing their knowledge.

Third, all but one of the subjects were United States workers. There may be issues associated with workers in other countries that the knowledge loss risk assessment methodology is not taking into consideration. It is suspected that there may be missing heuristics or that the heuristics used all reflect a United States cultural bias. Future research should also include more subjects working outside the United States. Several respondents did work for multinational organizations but that experience is not considered sufficient to say the methodology can be applied to organizations that have no United States connection.

Fourth, two respondents were Chief Executive Officers (CEOs). One was rated based on his experience but the other was not as he had limited experience and was the founding CEO of a new startup organization. Upon reflection it is realized that the knowledge loss risk methodology was not developed with corporate level officers in mind. The methodology may be appropriate but given the reported uncertainty associated with time in these positions it is expected that additional heuristics will be needed to support assessment of these individuals.

5. References


