Automated Life Underwriting

A Survey of Life Insurance Utilization of Automated Underwriting Systems

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Abstract

Many life insurance companies are turning to technology to speed and remove cost from the underwriting process. Automated underwriting systems have been developed to reduce the manpower, time and/or data necessary to underwrite a life insurance application, while maintaining the quality of underwriting decisions. Although these systems have been in existence for some time, not much is known about how they are used in the industry. The Society of Actuaries' Marketing and Distribution Section Council, the Product Development Section Council and the Committee on Life Insurance Research engaged Deloitte Consulting to conduct a survey investigating this question. The results of the study are presented in this report.

This report covers many aspects of how much industry interest there is for automated underwriting systems, the goals life insurers seek to accomplish in using them, how the automated systems function, and how successfully they perform. In addition to many detailed findings, the survey revealed several key points. First, life insurers have a strong desire to reduce the time and cost, and increase the consistency of underwriting. Second, while the penetration of automated underwriting systems is still relatively low, life insurers are quite interested in their potential to improve the efficiency of underwriting. Finally, despite some concerns with implementation and maintenance challenges, life insurers who are using automated underwriting believe they are beneficial to their organizations. If given the opportunity to reconsider whether to implement automated underwriting, even insurers who are less satisfied with their own systems would choose a different option, rather than forgo automated underwriting altogether. While these results are informative, the research team is also investigating several avenues for follow-up research into the effectiveness of automated underwriting, potentially including mortality experience and case-by-case comparison of automated versus traditional underwriting.

Keywords: Life Insurance Automated Underwriting, Rapid Assessment and Delivery, Speed to Issue, Life Insurance Underwriting, Underwriting Efficiency, Underwriting Cost Reduction, Underwriting Consistency, Underwriting Speed

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Rigorous underwriting protects life insurers from taking undue risks, but it also adds considerable expense to the bottom line, and is often cited as a barrier for underserved populations to insure themselves. The industry continually searches for methods to adequately underwrite individual applicants in ways which are less invasive, and more cost- and time-effective. Many life insurance companies see technology as a solution. In order to speed and remove cost from the underwriting process, they are turning to automated underwriting systems which interpret data traditionally reviewed by underwriters. Although these systems have been around for some time, little is known about how they are used by life insurers. Further, the knowledge that does exist is primarily anecdotal rather than formally documented. The Society of Actuaries' Marketing and Distribution Section Council, the Product Development Section Council and the Committee on Life Insurance Research engaged Deloitte Consulting to begin addressing this knowledge gap through a dedicated study.

Project Overview

The research team studied life insurance utilization of automated underwriting systems through a survey which addressed several issues:

- How much interest exists within the life insurance industry for these systems?
- How are they currently being used?
- How satisfied are life insurers in their experiences with these systems?
- How much has or could be done to study the mortality results produced by the automated systems?

Because life insurers utilize technology for underwriting in different ways, it is important to first clarify which type of system is analyzed here. For the purposes of this study, automated underwriting system is defined as follows:

> **Automated Underwriting System:** *a technology solution which is designed to perform all or some of the screening functions traditionally completed by underwriters, and thus seeks to reduce the manpower, time and/or data necessary to underwrite a life insurance application.*

Rather than focusing on any particular approach to automated underwriting, survey participants were asked to report upon any technology or methodology which meets this basic definition. Although they also aim to improve underwriting efficiency, systems whose main functions are to replace paper forms with electronic data and otherwise manage the workflow, but do not interpret any of the information upon which underwriting decisions are made, are not covered in this report.

Survey Method

The survey was administered online using the Websurveyor© system. Results were collected over the month of October 2009. The survey was delivered electronically to actuaries and underwriters representing 250 life insurers in the United States and Canada. Because they are more intimately involved with underwriting individual applicants, direct writers were included in the survey distribution while reinsurers were excluded. The distribution lists were compiled from the Society of Actuaries' member database, the Association of Home Office Underwriters' member database, and Deloitte's Insurance Benchmarking Center. Several vendors of well-known automated underwriting systems also provided a small number of client contacts. The research team attempted to distribute the survey to the appropriate actuarial and underwriter contact within each firm, but allowed those who were selected to solicit participation from another representative within their organization who was better equipped to respond. Both underwriters and actuaries were included to gather a range of perspectives.

Survey recipients were not selected based upon their use of, or interest in, automated underwriting. Instead, the survey was distributed to a wide range of life insurers without regard for these attributes. All survey participants were asked about the importance of various business objectives addressed by the automated systems, and their reasons for either using or not using a system. The remainder of the survey followed separate paths based on whether the given insurer is, or is not, using an automated underwriting system in its current process. Life insurers who are using automated systems were asked more detailed questions about their individual experiences. The full-length survey consisted of approximately 37 questions (depending upon several path-dependent answers). The survey for life insurers who are not currently using automated systems consisted of seven questions. In the analysis of the survey results, statistical significance is measured using the Student's t-test. The null hypothesis assumes two sample datasets under comparison have the same mean. The confidence levels reported represent the confidence with which this null hypothesis can be rejected. Unless otherwise stated, the statistical differences discussed in this report are significant at the 95 percent confidence level.

While the survey was distributed to a broad sample of life insurance companies, the 87 that did respond (102 total participants from 87 different companies) did so by self selection. Because prior interest in automated underwriting may have been a factor in their decisions to participate, the precision with which these results can be extrapolated to the life insurance industry is limited. This is particularly relevant for questions that relate directly to interest in automated underwriting. However, the bulk of the survey—which delves more deeply into how insurers are using automated underwriting—should be more robust. Participation bias introduced by interest in automated underwriting is muted among those already using systems. Still, systematic analysis of the surveyed population to assess its representativeness of the life insurance industry as a whole was out of scope for this research. Therefore, the results presented here more accurately portray the experience of the life insurers surveyed rather than represent that of the industry as a whole.

A copy of the survey is presented in Appendix B.

The survey participation list is presented in Appendix C.

Results and Analysis

The automated underwriting survey generated 102 responses during October 2009. These responses came from actuaries and underwriters at 87 unique companies. Forty percent of survey respondents work in actuarial roles within their organization, while the other 60 percent are underwriters. For this report, responses to subjective questions, such as importance of business objectives, are recorded for all participants. Responses to factual questions, such as system features, are recorded on a per company basis. Any conflicting responses to factual questions given by participants from the same organization were subsequently clarified. The detailed survey results are presented below in four subsections:

- Industry Engagement
- System Capabilities
- Targeted Markets and Applicants
- System Performance

A file containing the raw survey data is presented in Appendix C (participants only).

I. Industry Engagement

One objective of this research is to assess the level of interest the life insurance industry has for automated underwriting systems. Survey participants were first asked to classify themselves into one of three categories shown below in Table 1.

Table 1: Fraction of Life Insurers Using Automated Underwriting Systems

Percentage of Life Insurers	
Currently using an automated system	29%
Not currently, but considering	49%
Not using, and no plans to consider	22%

The data reveal that while only slightly more than one-quarter of respondents are using automated systems, many more are considering implementing one. While automated systems are still not commonplace, they are also not obscure, and appear to be positioned for growth within the industry. The potential bias respondents may express on this question in particular should be reiterated because it pertains explicitly to the level of interest in automated underwriting. The research team expects the life insurers who were invited—but declined participation in the survey—to be less likely to use automated underwriting systems, and also less likely to consider them. Still, even the raw number of respondents who indicated interest does demonstrate a material amount of interest in the subject.

Based upon statutory reported net admitted assets, participating insurers are classified as small, medium, large or very large. The classification scheme and breakdown of respondents is shown in Table 2.

Table 2: Sizes of Participating Life Insurers

	Net Admitted Assets	Percentage of Insurers Surveyed
Small	Less than $1 billion	23%
Medium	$1-10 billion	14%
Large	$10-50 billion	33%
Very Large	Greater than $50 billion	29%

Life insurers who participated in the survey also reported differences in how they are using automated underwriting systems based upon size of the firm.

Table 3: Difference in Automated Underwriting by Size of Insurer

	Using Automated Underwriting	Considering	Not Considering
Small and Medium	18%	52%	30%
Large and Very Large	32%	61%	7%

As shown in Table 3, large and very large insurers are considerably more engaged with automated underwriting than are small and medium insurers. The difference in the fraction not considering automated underwriting is statistically significant, while the difference in the fraction of large and small insurers using automated underwriting just misses the 95 percent confidence threshold. These data suggest that scale is an important factor in firms' cost-benefit analyses of automated underwriting implementation.

It is also interesting to note that underwriters from companies not currently using automated underwriting are much more likely to report they are considering systems. Actuaries surveyed from these companies are nearly split evenly, while underwriters considering an automated system outnumber those who are not five to one. This suggests that the idea for automated underwriting likely originates in the underwriting department, and actuaries become more involved as consideration spreads throughout the organization.

All survey participants were also asked to rate the importance of several different business objectives which the automated underwriting systems are designed to address. Respondents rate each objective from 1, "not important," to 5, "very important." Results presented below represent the average response for each class of participants (as defined by Table 1).

Figure 1: Importance of Business Objectives
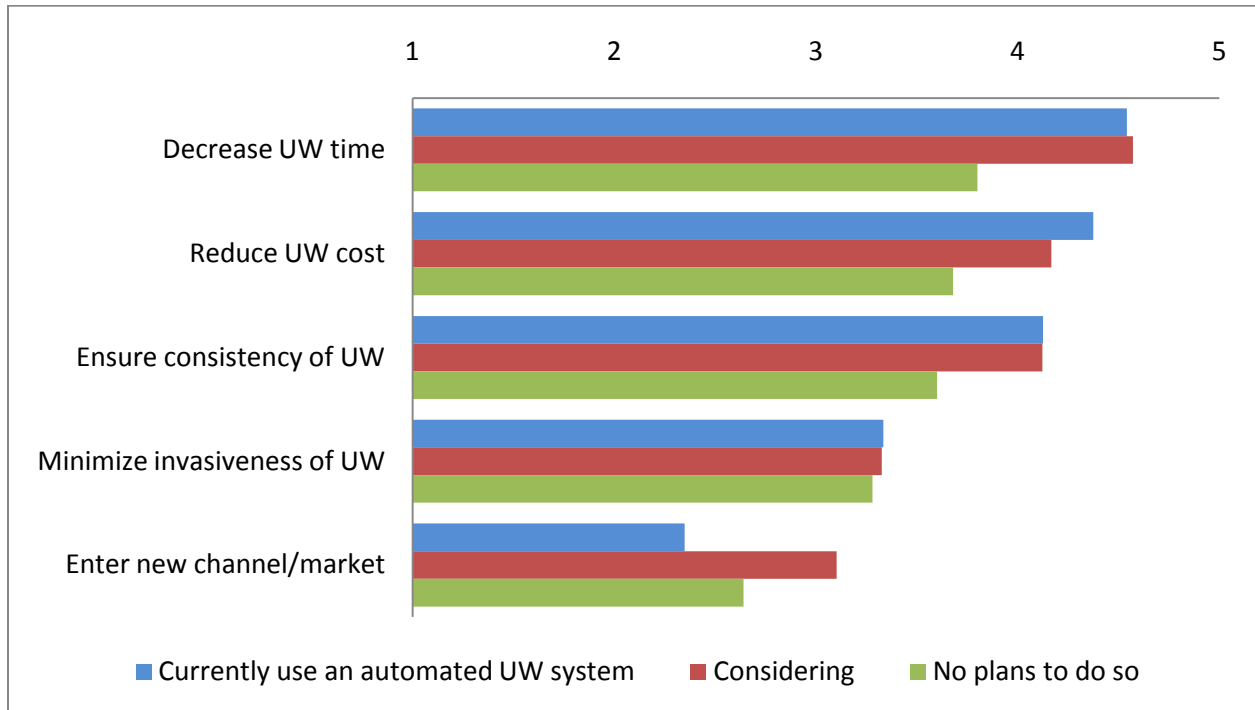
Clearly, these business objectives are of significant concern to life insurers. The top three concerns (cost and time of the process and consistency of the methodology and decisions) register greater than 4 out of 5 on the importance scale. Although the relative importance of these three concerns was in question prior to the survey, they were all expected to rate as top concerns given their direct impact on insurer profits. Firms are less, but still somewhat, concerned with minimizing invasiveness of underwriting. Although invasiveness is of more direct concern to the applicant than the insurer, the inconvenience of traditional medical underwriting requirements is often considered a material barrier that inhibits some potential customers from purchasing insurance. Other reasons cited for pursuing automated underwriting systems include responding to a current or projected shortage of underwriters. The order of these concerns is statistically significant.

Not surprisingly, insurers expressing interest in automated underwriting believe the top three objectives are more important than those who do not. It is quite likely that the importance of these concerns contributes significantly to these insurers' interest in automated underwriting, while other life companies feel less pressure to look for solutions. Similarly, these differences are significant.

In addition to those using automated underwriting versus those who are not, actuaries and underwriters also express different opinions about the importance of these business objectives. While the order of significance is the same, underwriters from companies that have not implemented a system rate each objective an average of 0.4 units higher on the 5-point importance scale. However, this difference disappears among companies that are using automated underwriting. This is likely because underwriters

always have responsibility for their own function, but others within the organization become more aware of their issues once a decision is made to make a major process change. The differing opinions of actuaries and underwriters are statistically significant.

After learning that, overall, insurers do feel strongly about improving the efficiency and consistency of underwriting, the natural subsequent question is why so many have not yet implemented an automated system. The 71 percent of survey participants who are not using automated underwriting were asked to rate the importance of several potential explanations using the same 1 to 5 importance scale. Average responses are presented below.

Figure 2: Perceived Barriers to Automated Underwriting System Implementation
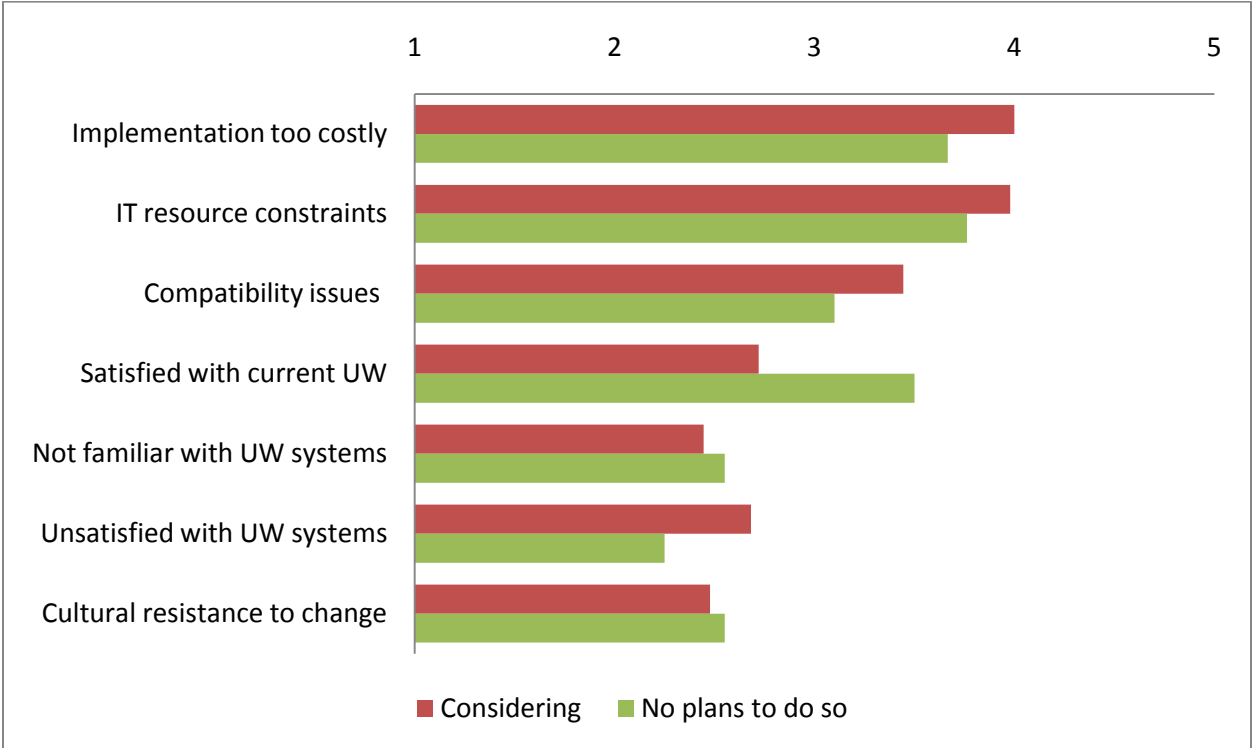

Life insurers surveyed report that difficulty implementing and maintaining automated underwriting systems are the primary reasons they are hesitant. The cost of implementation, limitations on IT resources (both for implementation and ongoing maintenance) and challenges incorporating the technology with current IT infrastructure were all cited as significant barriers. Interestingly, respondents generally do not believe that automated underwriting systems would fail to accomplish their stated objectives. Neither unfamiliarity nor dissatisfaction with automated systems on the market is a major issue. Rather than a lack in confidence in their ability to deliver improvements in underwriting efficiency, logistical issues appear to be the larger impediment to overcome. This trend is apparent even among life insurers who are not currently interested in automated underwriting. In contrast to the importance of each business objective, actuaries and underwriters view the barriers to automated underwriting similarly. The same is true for large and small insurers.

Perhaps surprisingly, cultural attachment to current underwriting and new business processes also ranks near the bottom of the list. Based on their potential to disrupt current professional responsibilities, the research team had expected automated underwriting systems to pose a larger cultural barrier.

Also notable, life insurers with no plans to convert to automated underwriting are much more satisfied with their current underwriting processes. This observation displays another logical reason why they are not currently pursuing these technologies, and why in Figure 1 they see improving efficiency of underwriting appears as a lesser concern. Other significant concerns cited by survey participants include lack of applicability to the particular product types and business mix important to each individual organization, and an inability to justify a large IT investment given the size of their life operations.

As suggested by Table 1, automated underwriting is commonly regarded as a growing trend in the life insurance industry. While it is not a longstanding practice, it is also not entirely new. Over 60 percent of companies using systems have been doing so for over five years.

Figure 3: Years Life Insurers Have Been Using Automated Underwriting Systems
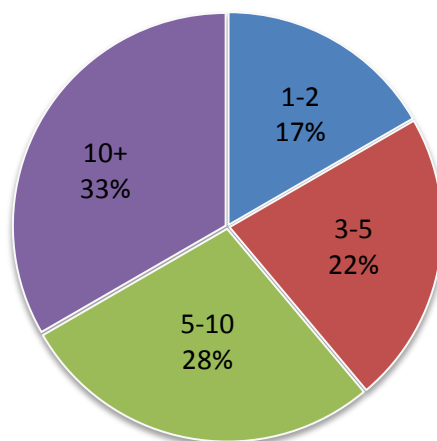
Among the different automated systems on the market, life insurers most frequently chose the one that best fit with their current underwriting process, and/or offered the greatest cost and time saving potential. Survey participants feel the cost of the system and the ease of implementation are material, but less important concerns when choosing a system. Specifically, over two-thirds of insurers surveyed cited the best fit and cost/time saving among their top three reasons for selecting their system, while 40 percent referenced system price. Despite the fact that many of the systems are developed and marketed by reinsurance companies, only a small minority of participating insurers believe that coordination with their reinsurer played a large role in choosing a system.

II. System Capabilities
Most of the survey studies the details of the automated underwriting systems currently used by the participating life insurance companies. Thus, the remainder of this report will focus on the responses of companies who are using automated systems.

Automated underwriting systems can employ several different approaches. Participants were asked to classify the approaches taken by their own systems. Note: a given system can employ more than one approach, and thus the total shown in Figure 4 is greater than 100 percent.

Figure 4: Methodologies Employed by Automated Underwriting Systems
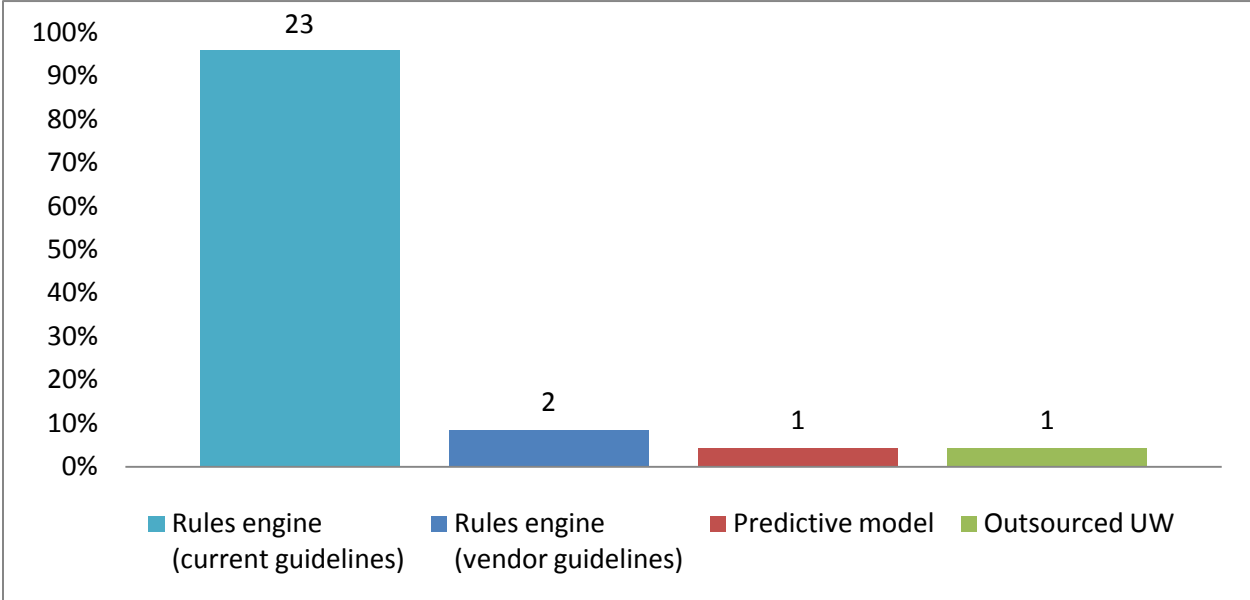
The survey reveals an electronic rules-engine built to replicate the insurer's existing underwriting guidelines is the dominant form of automated underwriting systems employed by life insurers. Alternate approaches and methodologies are not currently in widespread use. Examples of these alternate systems include rules-engines which employ an underwriting methodology determined by the system vendor, a predictive model which utilizes statistical techniques to identify and exploit patterns between explanatory variables and future claims (much like those common in the P&C industry). Rather than performing underwriting in-house, a life insurer could also provide underwriting data to outside vendors who perform the screening and return a decision. These data indicate life insurers are most comfortable with solutions that improve the efficiency of their current underwriting practices, rather than materially changing the data or thought process upon which underwriting decisions are founded.

In addition to differing approaches, the capabilities of automated underwriting systems also vary. Some systems can process a case from start to finish without involving an underwriter, while others act more as an underwriter's assistant through the review process. Some have the ability to short-circuit requirements that would typically be ordered through a traditional underwriting process. Life insurers surveyed were asked whether their system is capable of each of the actions described in Figure 5.

Figure 5: Capabilities of Automated Underwriting Systems
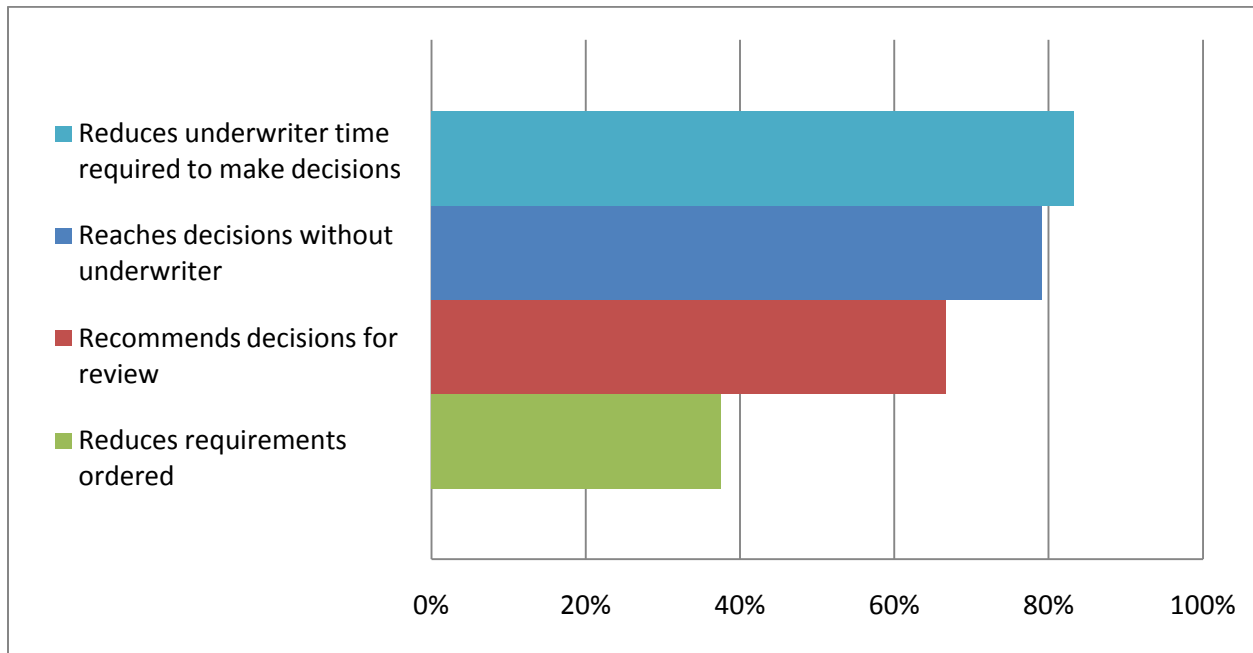
To clarify, these results describe what the systems can do, rather than how often each action is taken. As in Figure 4, because each system may be capable of some or all of these actions, responses shown here are not mutually exclusive.

Because these systems are generally automating existing underwriting processes, the reduction in requirements that approximately one-third of the systems can accomplish likely stems from identifying cases where the typical tests are unlikely to change the decision, and thus offer low protective value. In addition, requirements may be reduced by replacing traditional tests with alternative sources of data which attempt to provide similar information.

Consistent with Figure 4, most life insurers use automated systems to increase the efficiency of the current underwriting process more by playing the role of, or assisting, the underwriter than by fundamentally changing the underwriting methodology. Specifically, Table 4 below shows how life insurers surveyed utilize their automated systems to either reach or recommend underwriting decisions. The vast majority of systems (92 percent) can either reach a decision independently or recommend a decision for review and finalization by an underwriter.

Table 4: Systems' Abilities to either Reach or Recommend an Underwriting Decision

Does the system have the ability to?	
Both reach a final and recommend an underwriting decision	54%
Reach a final, but not recommend, an underwriting decision	25%

Recommend, but not reach, a final underwriting decision	13%
Neither reach a final nor recommend an underwriting decision	8%

We should also note that different life insurers may grant the same system different permissions. Therefore, the capabilities reported in the survey reflect how the life insurer is choosing to use a system, as well as the system's inherent capabilities.

Although most of the systems surveyed are rules-based underwriting engines, not all incorporate the same data into their decision making processes. Table 5 shows how many of the automated systems used by life insurers surveyed incorporate common data sources.

Table 5: Frequency of Data Use by Type

Percentage of Automated Underwriting Systems	
Traditional application / Paramed report	91%
Reflexive application with drill-down	74%
Lab results / Physical measurements	70%
Attending physician's statement	57%
Medical exam	57%
Additional medical requirements (e.g., EKG, stress test, etc.)	57%
MIB	83%
MVR	70%
Electronic Rx profile	57%
Other third-party data	35%

As expected, all of the automated underwriting systems base decisions on information from some form of an insurance application. Sixty-five percent can incorporate either a traditional application or one with reflexive questioning digging deeper into applicants' responses, 26 percent only use traditional applications, and the remaining 9 percent use only reflexive applications. Nearly half of these reflexive applications are relatively basic (10 or fewer drill-down questions), but one-third of them do have detailed follow-up (over 60 drill-down questions). Most systems can also incorporate the typical lab results and physical measurements. Fewer, but still a majority, process more intensive medical tests and

records. MIB and MVR reports are very common inputs, while electronic Rx profiles are prevalent, but not quite as widespread.

The data sources incorporated into the automated systems are influenced both by systems' capabilities and by the insurer's assessment of the value of the data. For example, since not all firms order electronic medication profiles in their traditional underwriting process, the automated systems of some of 43 percent of insurers surveyed whose systems do not use this information would probably have the ability to interpret it. In fact, it is likely the majority who do not use electronic Rx data for automated underwriting fail to do so not because of a system constraint, but rather because they believe it isn't worth the cost of the data for either traditional or automated underwriting. Omission of a more prevalent requirement, or one that typically includes free text such as an attending physician's statement, is more likely the result of the system's inability to process that information.

Table 5 also sheds light onto how life insurers are using automated systems to reduce requirements. Comparing the insurers from Figure 5 whose systems do and do not reduce requirements, we find significantly higher utilization of many underwriting common requirements for those systems which do not reduce requirements. These insurers are 30 percent more likely to utilize all types of medical requirements and MVR, and 10 percent more likely to incorporate lab results into their automated system. Insurers whose systems reduce requirements appear to do so in part through substituting alternate data sources for traditional requirements. Life insurers reducing requirements are 10 percent more likely to utilize MIB, and 30 percent more likely to incorporate electronic Rx data into their automated system.

Of course, to make use of each data source, it must be loaded into the system. The amount of manual processing required to load the data impacts the degree to which the systems can streamline the underwriting process. The survey participants reported that over half of the underwriting data loads are fully automated, while the rest require some degree of human interaction.

Figure 6: Automation of Underwriting Requirement Data Feeds
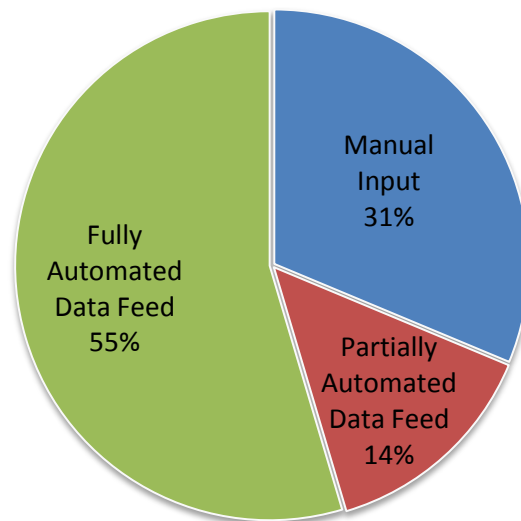
The degree of automation while loading application information mirrors the overall level. Requirements that are commonly transmitted in electronic form such as lab results, MIB, MVR and Rx profile are generally brought into the underwriting system via a fully automated process. However, most insurers find that utilizing further medical requirements (attending physician's statement, medical exams and other tests) requires manual entry.

III. Targeted Markets and Applicants

Some life insurers use automated underwriting for a particular product type, distribution channel, target market or risk class. Others view it as a widespread solution for the majority or all of their business. Survey participants reported on several aspects of how their automated underwriting systems are utilized.

To determine whether the automated systems were geared toward the healthy, unhealthy or all risks, life insurers were asked into which underwriting classes their system has the capability to assign individual applicants. As with Figures 4 and 5, Figure 7 represents frequency an underwriting system has the capability of assigning a particular class, rather than frequency of the actual underwriting class assigned.

Figure 7: Individual Risk Classes Available to Automated Underwriting Systems
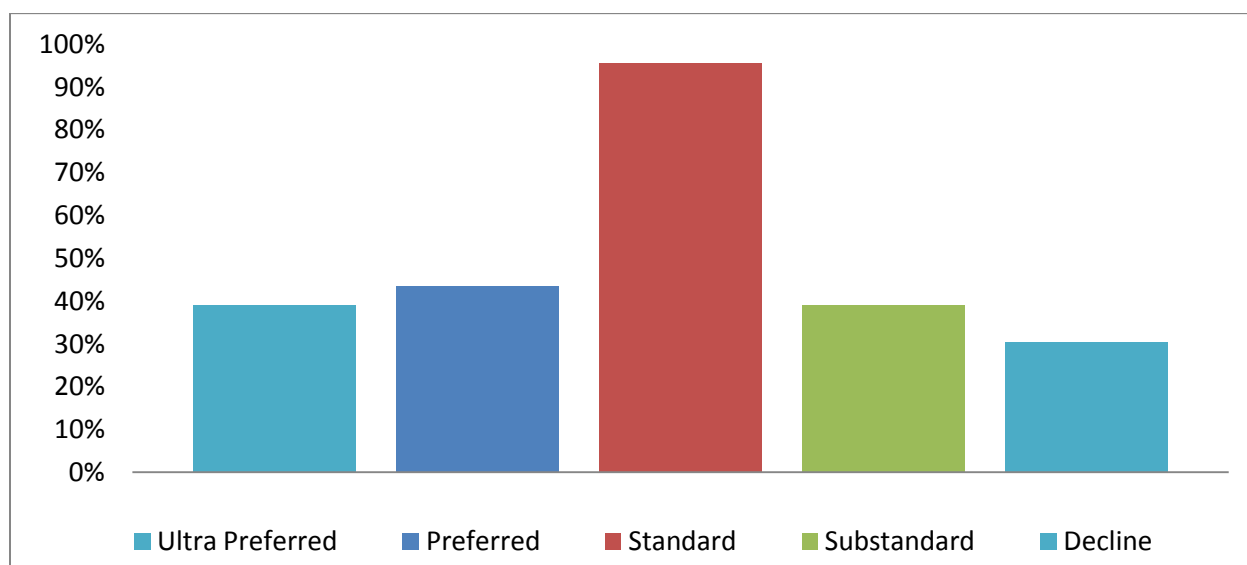
Of the systems which have the ability to either make or recommend an underwriting decision, nearly all can place an applicant in a standard class, but significantly fewer can offer opinions on better or worse risks.

Figure 8 shows a more complete picture of how life insurers are using the automated systems for applicants with varying degrees of risk. In this representation, each insurer falls into one of the following categories based upon into which group of underwriting classes their system can assign applicants.

Figure 8: Combinations of Risk Classes Available to Automated Systems
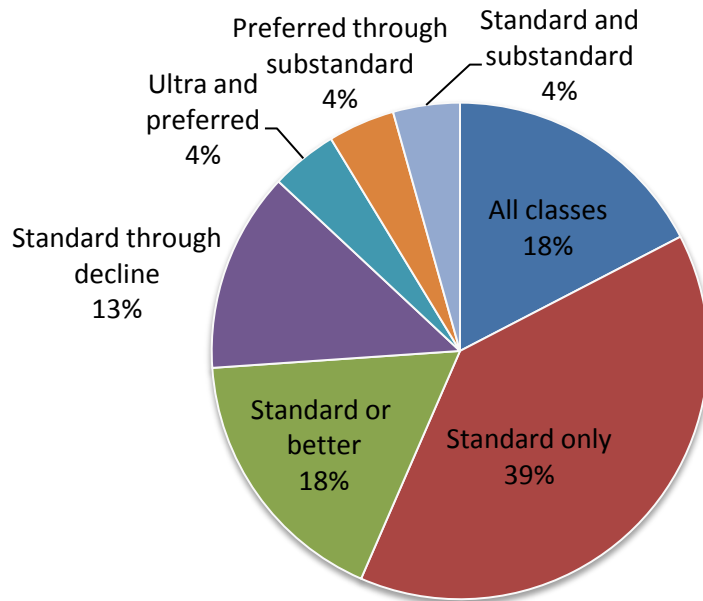
It is most common for participating life insurers to only allow automated systems to issue or recommend the standard underwriting class, and thus force cases that appear to be inappropriate for this class to be handled by an underwriter through a traditional process. However, a significant portion of the firms surveyed do allow their system a wider range of classes on either end of the risk spectrum. A modest number also allow the system purview of the entire range of risk classes.

In addition to health status, size of policy is also a common metric upon which to segment usage of automated underwriting. Survey participants were asked to rate its importance (from 1 to 5) with respect to each market segment. Average responses are presented below in Figure 9.

Figure 9: Importance of Automated Underwriting to Market Segments
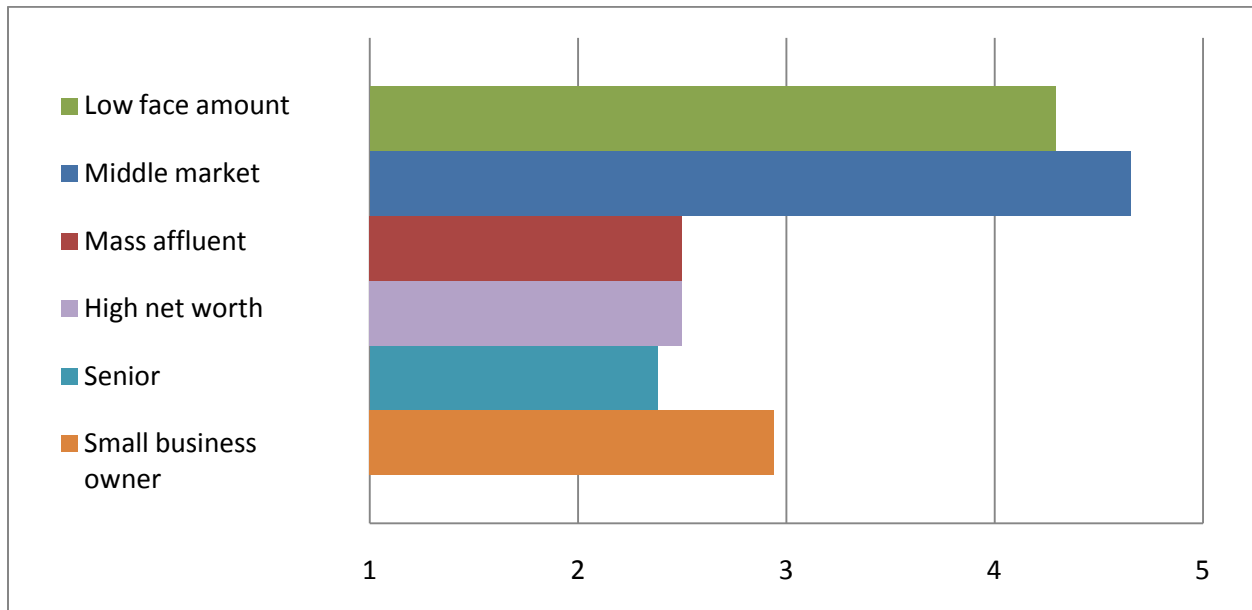
Consistent with common perception, automated underwriting tools are most important for smaller policies where underwriting contributes a comparatively large portion of the total cost to the consumer. These data suggest automated systems are tools life insurers are using to reach the traditionally underserved and difficult to access middle and low face amount markets. Larger policies and older applicants are not excluded from automated underwriting, but they receive less attention of efforts to improve efficiency because the cost of traditional underwriting processes is more easily justified when the stakes are higher.

Some life insurers participating in the survey place explicit restrictions on the applications processed by the automated system; others do not. Of the approximately half of the companies who do place restrictions, age and face amount are the common decision criteria. Maximum ages for applicants who are underwritten by the system range from 50 to 85, while minimum ages range from 16 to 20. Several firms cap the policies at $250,000, but others have multimillion dollar limits. No firms exclude applications generated through specific distribution channels from automated underwriting, but some only include policies which are slated for nonmedical underwriting, or exclude joint life products. Table 6 below provides additional detail on the products and distribution channels where automated underwriting has the largest impact for the participating life insurers.

Table 6: Percentage of Life Insurers Using Automated Underwriting by Product and Distribution Channel

Distribution Channel	Term	Perm	Term or Perm
Independent agents	33%	29%	42%
Captive agents	50%	58%	63%

Brokerage/General agents	25%	21%	29%
Financial institutions	21%	8%	21%
Internet	21%	8%	21%
Direct response with tele-underwriting	13%	13%	13%
P&C agent	21%	8%	21%
At least one distribution channel	88%	79%	100%

While some life insurers surveyed do send all the life applications they receive through the automated system, the average for all participating companies is approximately 60 percent. Incidentally, this 60 percent figure is virtually identical to the ideal usage these firms envision going forward. Firms that were using automated systems five years ago have, on average, increased the applications processed by the system by 10 percent (as a fraction of their total business). However, several of these firms have decreased usage over the period.

IV. System Performance

In addition to what the automated underwriting systems can do, the research focuses on how well they do it. Survey participants responded to a variety of questions investigating the performance of their systems.

Figure 5 above describes what types of action the underwriting systems are capable of, but the survey also studies the frequency with which each occurs. Respondents reported the frequency their underwriting tool is able to make an independent underwriting decision, recommend a decision, or is unable to provide additional information.

Table 7: Actions Taken by Automated Underwriting Systems

How often does the system?	Average	StDev	Range
Reach a final underwriting decision without underwriter review	41%	39%	100%
Recommend an underwriting decision for an underwriter to review	15%	22%	73%
Fail to reach or recommend an underwriting decision (due to data errors, complexity or otherwise)	44%	41%	100%

On average, the systems provide a result for slightly over half the cases they process. Further, in about 70 percent of those cases, no manual review is required by an underwriter. Still, for nearly half of the

cases underwriters must take over the review process without receiving at least a suggestion of the applicant's risk level. The degree of variation among insurers is also striking. Specifically, some firms reported having all underwriting decisions successfully made by the underwriting tools, while others reported the system being unable to make or even recommend decisions for any of the applicants. These differences are apparent even among systems that have the same capabilities (Figure 5). Note that neither all, nor necessarily the majority, of variation displayed here is driven by differences in the systems. Each life insurer may allow its own underwriting system a different amount of autonomy, or use it for different purposes. Indeed, there is a less than perfect, but still material negative relationship between how frequently the system reaches a final underwriting decision and how many of the insurers' applications it processes. Nearly a quarter of the variation in the ability to reach decisions is explained by the frequency of use. Using a least squares regression, the best estimate of this relationship is that a 10 percent increase in the fraction of applications processed by an automated system leads to a 4 percent reduction in the percentage of these applications upon which the system is able to make a final underwriting decision. This, along with relatively low face amount caps described above—which some firms impose—suggest that some insurers are using automated underwriting for a targeted subsection of their applicant population, such as simplified issue. Regardless of the reason, life insurers do depend on the systems to different degrees.

Further, despite processing similar fractions of their business with automated underwriting systems, the variation described in Table 7 appears to be systematic based on size of insurer. Small and medium insurers receive final underwriting decisions for approximately 60 percent of cases processed by the automated system, while that number is only 20 percent for large and very large insurers. This difference is statistically significant. Because other characteristics describing how insurers of different sizes are using automated underwriting are similar (e.g., objectives, system type, system capabilities, etc.), additional research is required to understand this trend.

Even if an underwriting system does not offer an opinion on the appropriate risk class for a particular applicant, it can still be a useful tool to manage the underwriting workflow by coordinating the requirements ordered, and alerting underwriters upon arrival of new information. Slightly over half of life insurers surveyed utilize their system for this type of coordination. These systems generally continue to manage the workflow even if the case is too complex for the systems to handle, i.e., the system cannot make or recommend a decision.

Life insurers using automated systems also assessed their effectiveness in accomplishing the business objectives described and prioritized in Figure 1. Responses were given on a scale of 1 to 5, "not effective" to "very effective." Individual firms selected "not applicable" for any objective which they do not share.

Figure 10: Effectiveness of Automated Underwriting Systems in Meeting Business Objectives
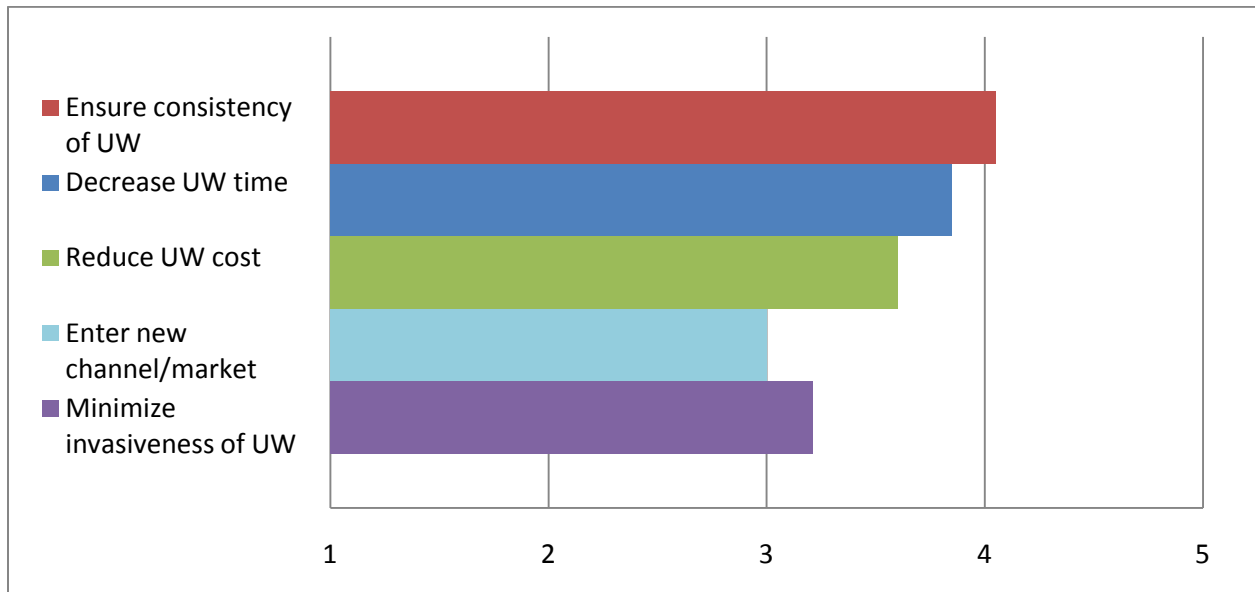
The survey participants have enjoyed material benefits from utilizing automated underwriting systems. While a somewhat tempered endorsement, they do rate the system as better than 3.5 out of 5 for the three most important objectives identified in Figure 1. These data suggest automated underwriting makes the largest strides ensuring underwriting decisions are made consistently, the third most important objective. The top two objectives in terms of priority, time and cost, follow behind consistency in effectiveness in the same order. Role within the company does not have a significant impact on the perceived effectiveness of the automated system, but size of organization and length of use do show potential relationships. While experience with other business objectives is similar, large insurers are finding significantly greater effectiveness of automated systems' abilities to ensure underwriting consistency, and are slightly less impressed by their abilities to reduce underwriting time. Although the initial importance of consistency was similar for large and small insurers (Figure 1), automation may convince large insurers it was lacking from their potentially less-centralized operations.

Further, Figure 11 shows the business objective results reported in Figure 10, broken down by whether the system has been in use for more or less than five years.

Figure 11: Effectiveness of Automated Underwriting Systems by Duration of Use
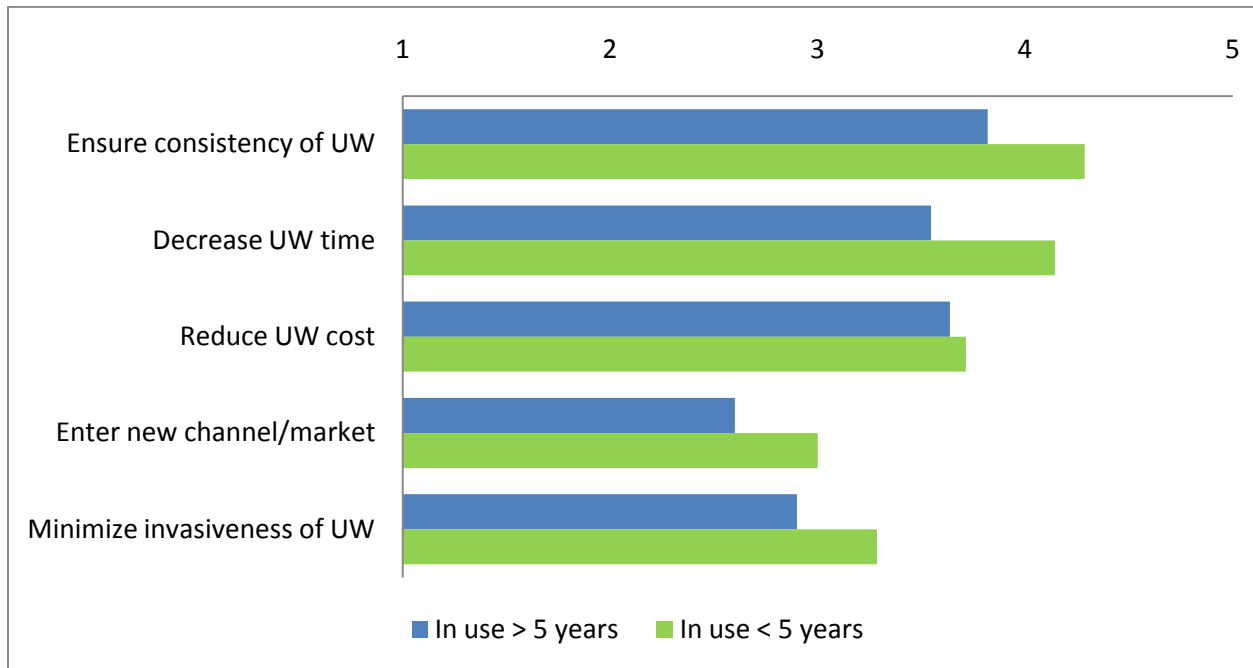
One may expect that the efficiency gains from automated underwriting would grow over time as an insurer becomes more comfortable with the system. But rather than expressing greater satisfaction, insurers who have implemented automated systems more than five years ago appear to be less impressed by their systems' abilities to meet each business objective. While these differences fall outside the 95 percent confidence threshold, they are significant at the 90 percent confidence level, which suggests a relationship is still likely. A possible explanation is that automated underwriting systems have improved in recent years and the newly purchased versions actually do perform better. However, an alternative and potentially more likely explanation is simply that excitement over the new system and process fades over time. The pain points of traditional underwriting may clear in the memory of insurers who have recently made the transition, while the baseline against which efficiency gains are measured may become less clear as automated underwriting is established as the new norm. In either event, the data suggest that insurers who implement an underwriting system today can expect to feel the benefits in a relatively short time frame.

While overall the systems are proving to be beneficial, they do also come with drawbacks. Figure 12 shows the frequency with which life insurers surveyed cite several different problems as significant concerns.

Figure 12: Significant Drawbacks of Automated Underwriting Systems
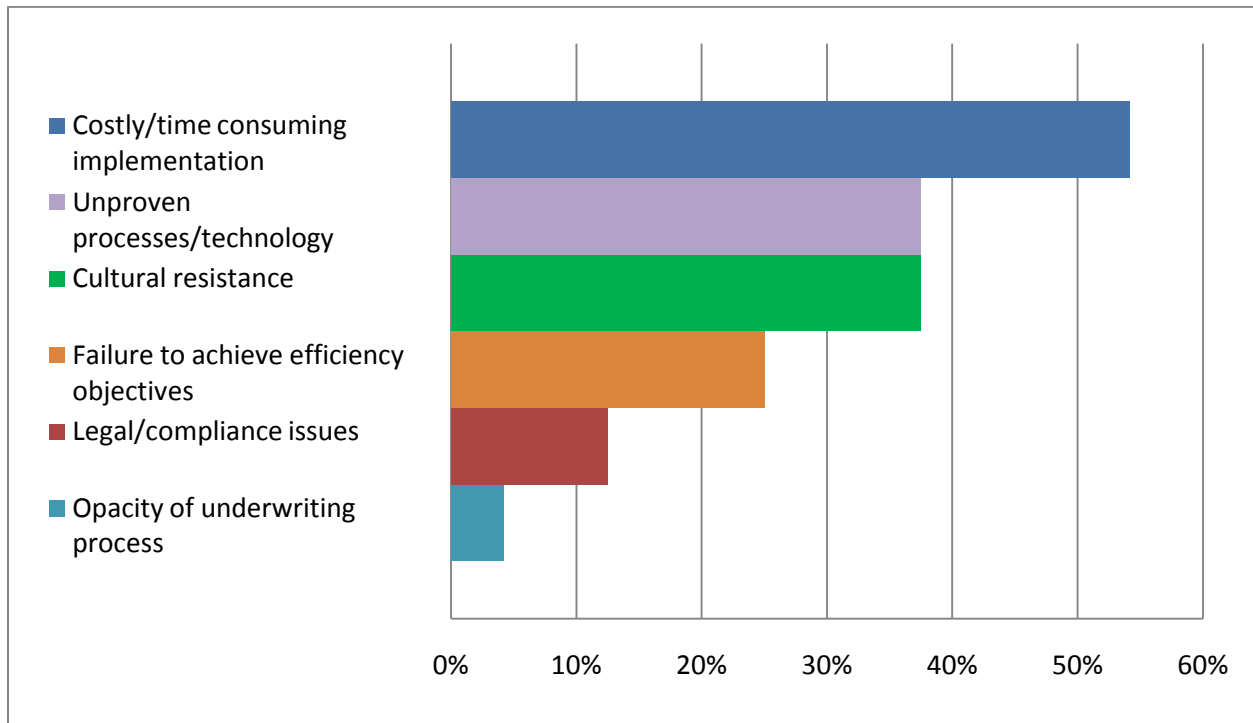
The data imply that firms surveyed which have not undertaken automated underwriting are correct to view technical implementation challenges as the most significant barrier (Figure 2). Life insurers who have begun using such systems found that challenges with implementation are the largest roadblock, with over half calling it a significant drawback. No other large concerns were common to more than half of insurers, but cultural issues and uncertainty of the system effectiveness do pose issues for close to 40 percent. Again comparing to Figure 2, the relative infrequency of significant issues with these two potential impediments is both encouraging and somewhat surprising. A technology-based solution which disrupts a well-established process like underwriting could easily generate strong push back from those comfortable with the status quo.

A sizable minority is dissatisfied with their own system's ability to meet the time and cost savings goals, but only several found that legal or compliance, or lack of understanding of the new process were significant issues. It is quite possible the automated systems encountered in this survey incur fewer setbacks in these areas because they are automated rules-based versions of existing underwriting processes, rather than algorithms that change the information or the methodology used to make underwriting decisions. Incidentally, several firms surveyed do specifically mention that a system with more artificial intelligence to handle cases where underwriting data is missing, or otherwise don't fit into an orderly rule-based decision tree, would be quite desirable.

Digging deeper into potential implementation challenges, participants rated the significance of several issues from 1 to 5, "not a significant challenge" to "very significant challenge."

Figure 13: Significance of Automated Underwriting Implementation Challenges
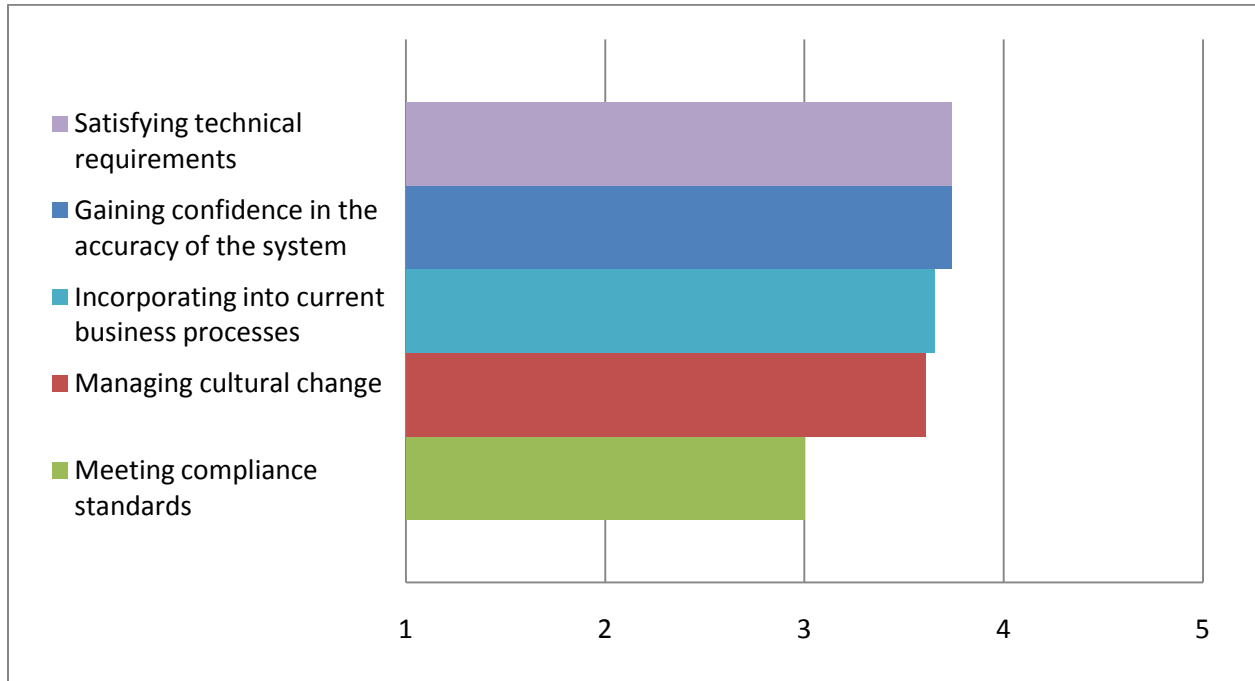
As has been indicated previously, implementation of automated underwriting systems presents a variety of issues for life insurers to overcome. Technical issues appear important again here, but so does managing cultural change. In fact, cultural change is closer in importance to technical issues here than in responses to other questions. Since this question focuses specifically on implementation rather than overall issues, it may be true that culture is an issue when systems are new, but then problems recede as people become comfortable with them. Compliance again is the least important issue, but does not appear immaterial. As a result of these issues, the average life insurer spends close to two years implementing an automated underwriting system.

To study cultural issues more closely, participants reported how receptive different groups within their organization were to making the change to underwriting with an automated system. Each group is assigned an average value from 1, "not receptive" to 5, "very receptive" as reported by all participating life insurers.

Figure 14: Receptiveness of Underwriting with an Automated System
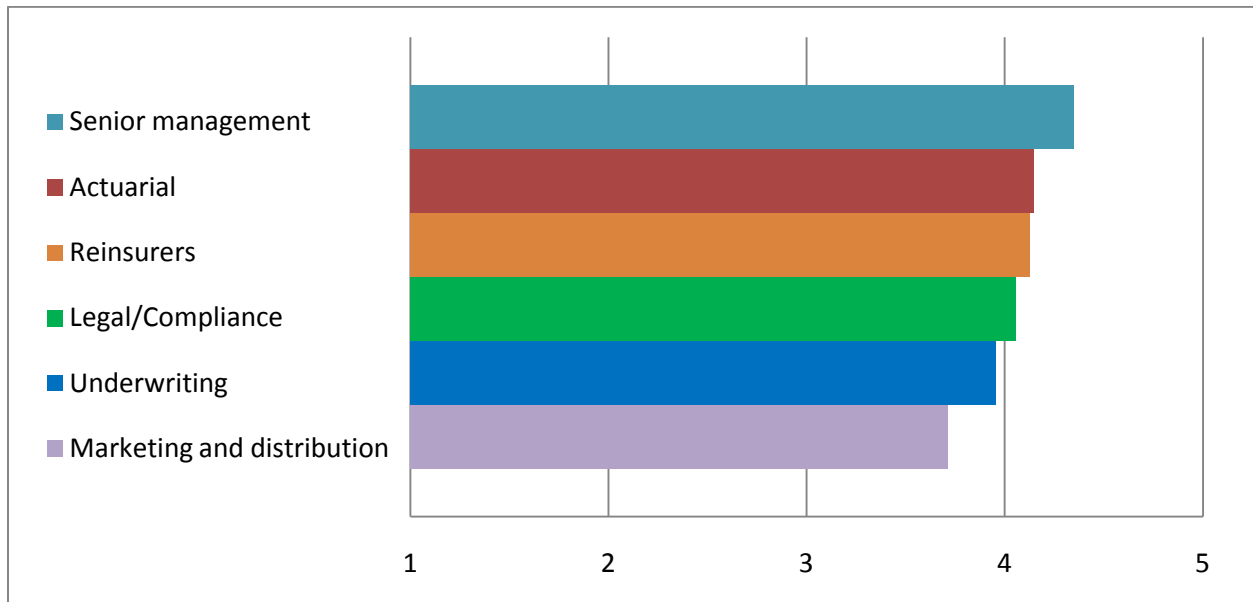
While Figure 13 demonstrates cultural issues are important, no group stands out as having particularly strong apprehensions. The relative openness of senior management is logical given the ultimate responsibility placed upon them to produce cost and time savings. In addition, changes to underwriting processes won't impact their daily lives in the same way it will cause underwriters to adjust how they perform their job functions. While still fairly receptive, marketing and distribution representatives were the least open among the survey participants. Although the increased underwriting consistency, cost reduction and decrease in invasiveness requirements should ultimately appeal to marketing and distribution, the initial uncertainty of a process change may cause their hesitation relative to other stakeholders. Producers may have gained comfort with the existing underwriting process, and feel they understand how the majority of their cases will be treated. Any change to this process, whether or not it is ultimately beneficial, could easily be initially greeted with skepticism. Further complicating the analysis, in this dataset there is a material difference between the openness of marketing and distribution at large and small insurers. Small insurers found marketing and distribution to be the most receptive group, while large insurers, the least. Addressing this trend requires further study.

Underwriters—the group arguably most impacted—appear to be more welcoming than one might expect given the natural resistance to change that often occurs when disrupting well-established norms. It is worth reiterating that survey participants are senior members of the underwriting and actuarial staff of participating firms, which may impact how they view their and other teams' receptiveness to the system. Surprisingly, both actuaries and underwriters believe the other group was more receptive than their own. This suggests that some level resistance exists within each stakeholder group that is not communicated to others in the organization.

Life insurers surveyed identify different strengths and weaknesses of automated underwriting systems. To help weigh this information, they also provide an overall assessment of their system. On the 1 to 5

satisfaction scale, the average life insurer rates its system a respectable 3.6. None are completely dissatisfied, while nearly 20 percent are very satisfied. In total, the systems' material successes improving the consistency, time and cost of underwriting generally outweigh the implementation challenges. Automated underwriting systems are making measurable contributions to the life insurers who have decided to begin using them.

Although once implemented, life insurers generally have positive feelings about their own automated underwriting system, a better metric may be what decision they would make if they were given another opportunity. Participants chose among three options for the hypothetical repeated decision.

Figure 15: Decisions Made if Given Second Opportunity
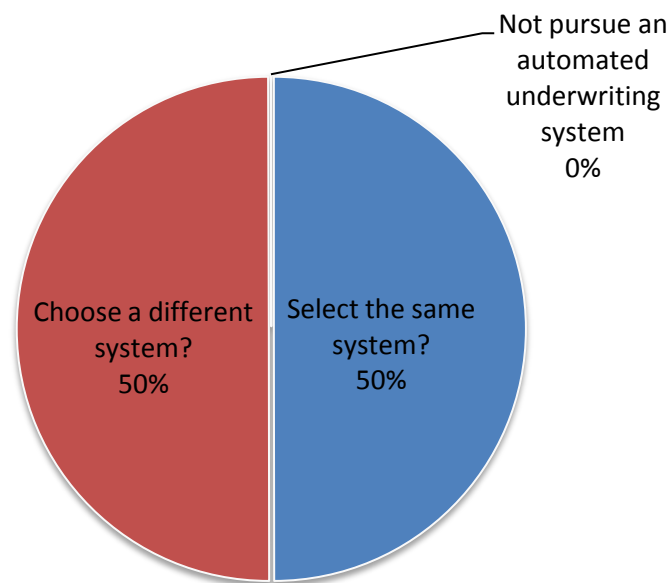
While only half of respondents believe they chose the best option, all life insurers remain committed to the idea of automated underwriting. Rather than becoming convinced that automated underwriting is ineffective or impractical, they believe the particular challenges encountered in using their own system would be less significant with another system. Because nearly all insurers found the implementation process challenging, these opinions suggest a "grass is greener" phenomenon with the hope that the particular issues they encountered would be avoidable.

Several specific differences are apparent between insurers who would keep versus switch automated underwriting systems. Not surprisingly, life insurers who would select the same system have statistically significant higher overall satisfaction than those who would change, namely 4.1 compared to 3.1. The largest driver of this satisfaction appears to be how frequently the system is able to make or recommend an underwriting decision.

Table 8: Experience of Insurers Who Would and Would Not Choose the Same System

How often does the system?	Insurers who would choose the same system	Insurers who would choose a different system
Reach a final underwriting decision without underwriter review	51%	27%
Recommend an underwriting decision for an underwriter to review	23%	9%
Fail to reach or recommend an underwriting decision (due to data errors, complexity or otherwise)	26%	64%

Insurers who would choose the same system receive valuable information for 74 percent of applicants, while the insurers who are less satisfied do so at half that rate. As suggested by Table 8 and the previously described relationship between insurer size and automated system output (Table 7), large insurers are less satisfied than are small insurers. These results are also statistically significant.

To a lesser degree, the priorities of business objectives also differ between these two groups. The more satisfied insurers prioritized reducing time as the most important business objective, followed by consistency and reducing costs. Insurers who would choose a different system are first looking to reduce costs, then time, and were less interested in ensuring consistency. Because the participants indicated that automated systems are most effective in ensuring consistency compared to other efficiency objectives (Figure 10), it is logical that those who placed greater importance on consistency would be more satisfied. There are no significant differences in how the two groups of insurers perceived the automated underwriting systems' abilities to achieve these business objectives, nor were their material differences in the number of significant drawbacks they experienced. Overall, the insurers who would confirm their initial selection found statistically significant greater cultural receptiveness for automated underwriting, particularly among marketing and distribution and underwriting.

Conclusions

The survey has revealed interesting facts about how life insurers are making use of automated underwriting solutions. In addition to the many detailed findings, there are several key themes to take away from this research. First, life insurers have a strong desire to improve the efficiency of underwriting. Time, cost and consistency in underwriting are all important issues for life insurers. Second, there is significant interest within the industry for what automated underwriting systems have to offer. While the penetration of these systems is still relatively low, the number considering systems indicates the potential for growth. Specifically, the life insurers surveyed that are still in the exploratory phase outnumber those that have implemented systems by approximately two to one. Finally, life insurers that are using automated underwriting generally believe that the systems are net positives for

their organizations. Despite some concerns with the technical and other implementation and maintenance challenges, life insurers surveyed believe they are improving the efficiency of underwriting, and are satisfied with them overall. Even insurers that are less satisfied with their own system have not soured to the idea of automated underwriting. Given the chance to reconsider their pursuit of automated underwriting, they would choose a different system, rather than forgo the idea altogether.

Further Study

This survey presents a broad introductory view into how life insurers are currently using automated underwriting systems, their level of satisfaction and their future plans. Undoubtedly, more detailed research could add to understanding of what factors affect life insurers' decision-making processes surrounding automated underwriting, and what drives their varying levels of success.

Beyond learning how life insurers are using automated underwriting systems, the other large goal of the survey was to determine how much has been done to study the effectiveness of automated underwriting systems. This research is contributing to the development of a potential phase two research project. The research team is investigating several avenues for continuing research into the effectiveness of automated underwriting. The first is collecting mortality experience data for firms who have requisite experience with automated underwriting systems, and developing an inter-company mortality study. A complementary path of analysis is to understand how the decisions made by an automated system compare to those made through the traditional underwriting process. Upon implementing a system, some insurers run the traditional and automated processes in parallel for a period of time, and perform a study comparing the two. Some firms surveyed have performed such studies, and it may be possible to combine these results for a broader analysis. The research team is currently developing a plan for conducting this phase two research in early 2010.

Appendix A: Acknowledgments

In addition to the survey participants who made this report possible, we would like to thank the members of the Project Oversight Group (POG) for their input and review throughout the survey design, data collection, analysis and presentation.

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Appendix B: Automated Underwriting Survey

A PDF copy of the survey is presented here. The online version contained several paths. Most notably, answering "Yes" to question four concerning current use of an automated system leads to the complete survey, while responding "Not currently, but considering" or "No, and no plans to do so in the future" advances participants to question 38.

SOA Survey of
Automated Underwrit

Appendix C: Survey Participants

The life insurance companies that participated in the survey are shown below.

ACE Tempest Life Re	HSBC Insurance Services
AGL Life Assurance Company	Indiana Farm Bureau Insurance
Alfa Life Insurance Corporation	Individual Assurance Company
Allianz Life	ING
Allstate Life	Jackson National Life
American Fidelity Assurance	John Hancock Life
American Health & Life Insurance Co	MassMutual
American-Amicable Life Ins Co of Texas	Max New York Life Insurance Co.
Americo	Minnesota Life
Assurity Life Insurance Company	Modern Woodmen of America
AVIVA USA	MTL Insurance Company
AXA Equitable	National Western Life
Berkshire Life	Nationwide Life
BMI Financial Group, Inc.	New York Life
BMO Life Assurance	Northwestern Mutual Life
Canada Life	NTA LIFE
Conseco	Old Republic Life Insurance Company
Co-operators Life Insurance Company	Pacific Guardian Life
COUNTRY Life	Pacific Life
CSI Life Insurance Company	Principal Life Insurance Company
CUMIS Life Insurance Company	Protective Life Insurance Company
CUNA Mutual Insurance Society	Prudential Insurance Company
EMC National Life	RBC Life Insurance Company
Empire Life	Reserve National Insurance Co
Equitable Life & Casualty	Sagicor Life USA
Equitable Life Insurance Company of Canada	Shenandoah Life Insurance Company
Farm Bureau Life Ins Co	SSQ Financial Group
Farmers New World Life Insurance Company	State Farm
Federal Life Insurance Co. (Mutual)	Sun Life Financial
Federated Life Insurance Company	Sun Life Financial Canada
Fidelity Life	Sun Life Re - Retro
First Investors Life Ins. Co.	Symetra Life
Foresters	Teachers Protective Mutual Life Ins Co
Forethought Life Insurance Companies	Tennessee Farmers Life
Genworth	The Baltimore Life Insurance Companies
Gerber Life Insurance Company	The Cincinnati Life Ins. Co.
Hartford Life	The EPIC Life Insurance Co.
Hooper Holmes Services(MAAS)	The Lafayette Life Insurance Company
Horace Mann Life Insurance Company	Thrivent Financial

TIAA-CREF
Transamerica Life Canada
UNIFI insurance companies
Unified Life Insurance Company
United Heritage Life Company
USAA Life Insurance Co.
VantisLife Insurance Company
Western Fraternal Life Association
Woodmen of the World