

Technology's Effect on Property-Casualty Insurance Operations

Robert Puelz*

*Dexter Professor of Insurance, Edwin L. Cox School of Business, Southern Methodist University, Dallas, TX 75275. rpuelz@mail.cox.smu.edu. I am grateful to Jerry Johns of the Southwestern Insurance Information Services, and my communications with David Repinski of Cunningham & Lindsay, Mike Reid of Liberty Mutual, Jim Snikeris of Farmers, and James Lankford of Texas Farm Bureau. Finally, thanks to Robert Quirk and Henry Wyche for research assistance.

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Abstract

The post Glass-Steagall era has presented insurers with new opportunities and risks during a time when information flows and business processes are being impacted by changing technology. In this paper, we explore how insurers use and perceive current technology to carry out their operations by reporting results from a sample of insurers that includes some of the nation's largest property & casualty insurers. We find among insurers in our sample that an online channel is having a significant impact on customer retention and revenue enhancement, but a lesser impact on cost reduction. Interestingly, about two-thirds of our sample has experienced an increase in their overall number of transactions following the adoption on an online channel. Moreover, while the Internet is perceived as giving marketing benefits it is not being used as a substitute for agents. We find that 65% of respondents have used technology to integrate customer data across functional areas and another 23% plan to do so in the next three years. Nearly 71% of respondents have or plan to adopt service-oriented architecture in their technology infrastructure.

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I. Introduction

One of the tasks of insurance academicians is to help stakeholders and students of the industry understand the functioning of insurance markets, the risk transfer that takes place and the business proposition of how one can maximize the wealth of an insurer's owners. Structural shifts in business occur for reasons attributable to knowledge, creativity and vision; technology is often a catalyst that nurtures new ways of thinking. The following encapsulates one insurance executive's thinking about the industry:

“Among the student body are many who will be in the next generation of leaders in the insurance industry. They can look forward to a career with even more stimulating challenges than the industry offers today. There will be fewer people doing things that machines can do and more people doing those important things that only people can do. The most challenging aspects of these electronic methods are the human rather than the mechanical—the decrease in routine tasks; the varied new skills which are needed for the new jobs created; and the growing importance of research, analysis, organization, and planning. There are truly interesting years ahead for all who are so interested in insurance.”

The quote appeared a half-century ago in the *Journal of Risk and Insurance* and its applicability today is remarkable. Indeed, it could be argued that some insurance firms, caught in a managerial stasis of thought, would do well to heed the call by Bagby about the “growing importance of research [and] analysis.” For some insurers their internal structure has remained settled over the years with the areas of pricing, underwriting and claims the predominant functional areas that define this business form. Taking an appropriate risk for a given price then honoring the contract when a loss occurs is the essence of value provided by insurers. While we know risk transfer is as old as the “contract of Bottomry” included in the Code of Hammurabi the recent changes in the legal environment and unprecedented technological innovation present opportunities not seen by

insurance managers of the past.¹ Gramm-Leach-Bliley (“Financial Services Modernization Act” of 1999) has given a structural opportunity to other financial institutions to enter the insurance business and vice versa. Optional federal chartering of insurers as an alternative to state regulatory regimes is an idea that has not yet gained significant traction in Congress but affords the opportunity to create an insurance environment with more flexibility, choice and competition.² Relaxing legal strictures offers the potential for an unencumbered, more diversified financial environment. Perils exist for current management, however, since stakeholders expect more flexible thinking.³ Staid and mature insurers and their management teams are not likely to exist in a more traditional form as new competitors enter their market; consequently, insurers ought to be ripe for new ideas that develop profitable lines of business and control costs. How an insurer has used technology to enhance a functional area or its integration with other operational components likely reveals the wisdom of management in enhancing shareholder value.

The process of managing workflow is part strategic, part administrative. While the Internet may be used to receive marketing inquiries some companies with exclusive agency arrangements weigh the benefits of direct marketing communications against disenfranchising the existing distribution channel. Thus, for example, Texas Farm Bureau which is a rural insurer with about 180 offices spread throughout Texas, takes an Internet inquiry and feeds it to a member of its captive agency force.⁴ Once the application is taken the process is automated with technology beyond the Internet playing a role. Agents submit applications electronically through a company network. The underwriting process for auto insurance begins with the raw data being fed into Choicepoint

¹A contract of Bottomry dates to Babylonian times where loans were forgiven if a ship suffered a robbery loss while in transit. If the ship’s journal was uneventful the interest charged on the loan was higher than normal market conditions, in other words, it included an insurance premium. See Trenerry (1926).

²Optional federal chartering of insurers has been studied for life insurers, see Bair et al (2002) <http://www.isenberg.umass.edu/finopmgt/uploads/basicContentWidget/8631/bair-cons-ramifications.pdf>, and England has provided a more general synopsis on the topic, <http://www.cei.org/pdf/4358.pdf> that includes numerous references to the work of Grace and Klein (2000) and Harrington (2002).

³The academic literature is turning in this direction, too. Skipper and Kwon (2007) include a chapter dedicated to the issue of financial services integration in their recently released textbook.

⁴Thanks to James Langford of Texas Farm Bureau for sharing the operational process of his firm.

software that is given parameters by management for the risk's acceptability.⁵ In addition, an electronic check of the new applicant's prior carrier activity, credit rating and motor vehicle report is undertaken and an overall profile of the risk is created and an electronic underwriting determination is made. In cases where the applicant does not fit the profile established by management, manual underwriting is undertaken as a second tier of investigation of a risk's acceptability. In this example, the technology advantage over human intervention is both an error elimination and scale economies bonus to the insurer's operations, but, for this form, maintaining loyalty among its traditional distribution channel.

A broader view of technology's effect on the operations of P&C insurers is the focus of this paper. While a LOMA forum cites that 41% of the information technology budget goes to core, fundamental processing of the insurance business and only 19% is allocated to channel management, there is the expectation that IT will be better utilized to help grow business if systems are in place that can support new growth.⁶ Thus, one question answered by this research is what are the existing technologies identified by insurers that will help grow their business, and where do they expect growth to occur? An associated question is what are the existing technologies identified by insurers that help to service their existing business. Answers to these questions are provided in the responses from 17 insurers who responded to a survey instrument that focused on the operational impact of technology.

One of the goals of the paper is to move beyond the traditional siloed approach to insurance operations and present current management ideas that take advantage of technology to modify overall operations. Since insurance industry profitability in recent years has been driven by investment performance that has offset insured losses and operational expenses, successful methods

⁵See http://www.choicepoint.com/business/pc_ins/pc_ins.html

⁶See <http://www.loma.org/res-08-05-SF-anaylsts.asp>.

to minimize cash outflow or turn an insurance profit may reside in technological innovation. How have the operational pieces of an insurance company’s structure become more integrated through the advent of technology? What are the key technological innovations used in practice and how have their utilization translated to efficiency, market opportunity and profitability? The survey instrument utilized in this paper and included in the Appendix was structured with support from the industry through interviews and other communications. While the analytical approach to this paper is necessarily descriptive the results are revealing about how the effective use of technology and innovation have altered the managerial landscape in the insurance industry.

II. Background to this study

As background, the traditional view of insurance company operations is encapsulated in various industry texts, for example, Myhr and Markham (2004) describe three main functional areas of an insurance company (marketing, underwriting and claims) supported by nine additional areas outlined in the following table:

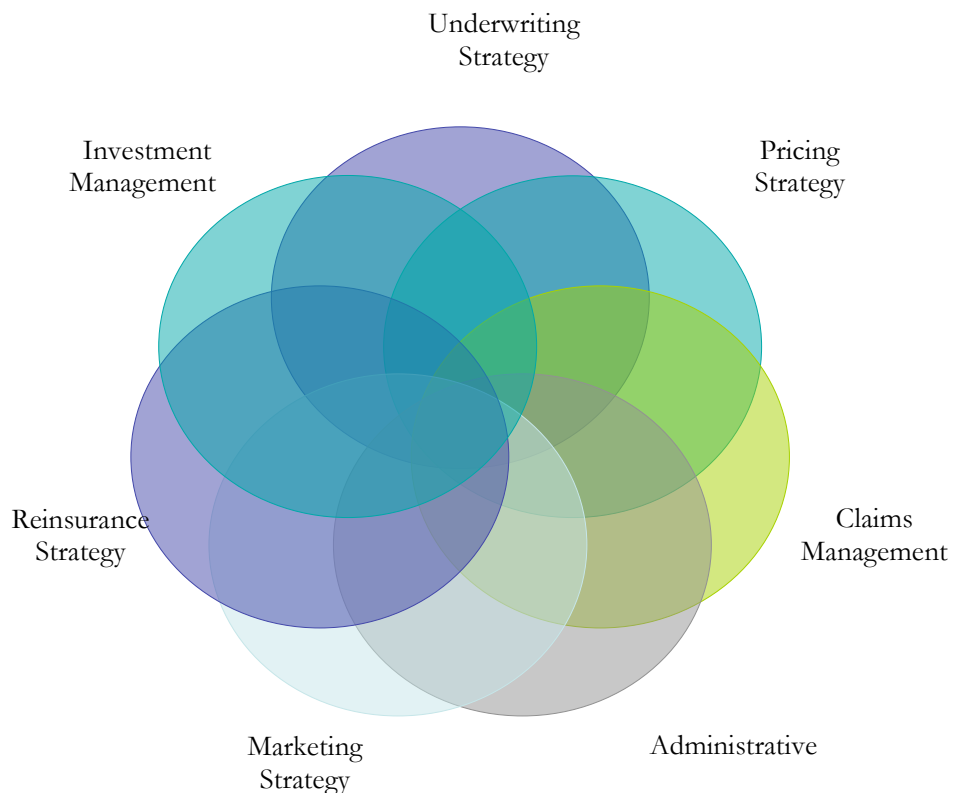
Table 1

Marketing	Underwriting	Claims
	Loss Control	Reinsurance
Actuarial	Investments	
	Information Technology	Premium Audit
Human Resources	Legal Services	Accounting

Because an insurer has a well-defined process, the insurance business model begins with this structure, running the risk that strategy will be considered and implemented within these core silos without considering interactions. Myhr and Markham discuss interdependence in the following manner, “Although each function within an insurer must have some autonomy to perform its work, those functions are far from completely independent. They must interact constantly if the insurer is to operate efficiently,” although that is about the only attention these writers pay to the topic. Trieschmann, Hoyt and Sommer (2005) give a different explanation of an insurer’s operations. They

offer the following listing of insurer functions: Production, Underwriting, Rate making, Managing Claims and Losses, Investing and Financing, Accounting, and Miscellaneous activities that involve legal, marketing research, engineering and personnel management. Pritchett, Schmit, Doerpinghaus and Athearn (1996) are brief in their description of an insurer offering the “flow of an insurer’s operation,” to include: Management, Actuarial, Marketing, Underwriting, Administration, Investments, Legal and Claims. The intent of this research is to provide and quantify that broader perspective. One goal of this research is to lay the foundation for a refreshed understanding how traditional operational areas can be melded together by technology. This integration of the functional areas, conceptually depicted in Figure 1, overlays the distinct operational areas upon one another with technology serving as the bonding agent, or at least, permitting managers to adopt technology as a bonding agent.

Figure 1



III. The Survey and the Participants

The survey instrument was web-based and entailed about forty questions. The final survey product had the benefit of input through conversations with various insurance industry executives. The instrument was e-mail distributed through both the Southwest Insurance Information Service (SIIS) and the National Association of Mutual Insurance Companies (NAMIC) in which member companies were invited to participate. The seventeen insurers that responded are listed in Table 2. While the number of responding companies has created a relatively small sample it does include major U.S. insurers along with a number of small insurers. The size effect on technology utilization is apparent in the results.

Table 2

Texas Farm Bureau Mutual Insurance Company	Liberty Mutual*
Farmers Insurance*	Mercury Insurance
Texas Windstorm Insurance Association	Magna Carta Companies
Allstate*	Infinity Insurance Companies
American Modern Insurance Group	Nationwide*
Service Lloyds Insurance Company	State Farm Insurance*
Accredited Surety and Casualty Company, Inc.	Travelers*
Hochheim Prairie Farm Mutual Insurance Assoc.	EMC Insurance Companies
Beacon Insurance Group	

*Companies identified as “large” in this study had total assets of at least \$19 Billion.

IV. Findings: The Online Channel

A natural starting point for research into the role of technology for insurers is the role of the Internet. Our first area of interest was the value proposition of online distribution channels. Do insurers view this channel as an opportunity to reduce costs, enhance revenues, or better retain their customers? Dennis Campbell (2003) has written on the impact of electronic distribution channels in financial services and found that in his sample of customers at a single bank that online customers exercised more transactions while also more closely monitoring bank activity to save money from

minimum balance penalties. While Campbell found that online customers are less profitable to a bank in the short-run, he also found that these customers were more reliable revealing higher retention rates.

In our study survey participants were asked to assess from low (1) to high (3) how an online channel has helped in cost reduction, revenue enhancement and customer retention. The results in Table 3 indicate that from a management perspective an online channel does not have low impact on any of the key value propositions; the range is from medium to high indicating the importance to these three business goals. In particular, customer retention appears to be a driving force in insurance management interest in an online channel and more so among relatively smaller insurers. Larger insurers see revenue enhancement as a key reason for having a web presence. While both Campbell’s results and the findings herein were obtained from stakeholders who fall under the financial services umbrella, Campbell’s sample was at the consumer level and this survey is at the managerial level. Interestingly, Campbell’s findings, that revenue reduction when technology is deployed in the form of pc banking, are not mirrored by the expectation of insurer management that an online channel will enhance revenue.

Table 3

Small Insurers	Average
Cost Reduction	2.09
Revenue Enhancement	2.18
Customer Retention	2.63
Large Insurers	
Cost Reduction	2.17
Revenue Enhancement	2.67
Customer Retention	2.33
All Insurers	
Cost Reduction	2.12
Revenue Enhancement	2.35
Customer Retention	2.53

To gain further insight into what is driving insurer expectation for online channel performance we asked two questions related to the value proposition which asked survey participants to assess their results following the adoption of an online channel. First, did total transaction volume increase following the adoption of an online channel, and second, was there an erosion of offline business following the adoption of an online channel? “Yes” took the value of 1 and “No” took the value of 0. While 65% of all respondents indicated that total transaction volume did increase, 73% of smaller insurers saw gains in total transaction volume. The overall sample results expressed in Table 4 are consistent with Campbell’s findings for banks. The results are also linked to the type of traditional distribution system in place among the survey respondents.

Table 4

Small Insurers	Average
Proportion experiencing transaction volume increase	0.73
Proportion experiencing erosion of offline business following online channel adoption	0.55
Large Insurers	
Proportion experiencing transaction volume increase	0.5
Proportion experiencing erosion of offline business following online channel adoption	0.17
All Insurers	
Proportion experiencing transaction volume increase	0.65
Proportion experiencing erosion of offline business following online channel adoption	0.41

For example, since Cummins and VanDerhei (1979) there has been evidence that those firms that utilize an independent agency system are less efficient compared with their exclusive agency, direct-writing counterparts, and Berger, Weiss and Cummins (1997) have shown that higher quality services offered by independent agents justify their higher expenses, and partially explain why both types of distribution systems were able to co-exist. An online channel changes the marketing

distribution mix in today's environment, and interest among small insurers may reflect the cost-effectiveness of investing in an online channel for insurers if they have employed more expensive traditional distribution methods. By contrast, an increase in transaction volume after establishing an online channel was experienced by as many larger insurers as small insurers. Finally, survey evidence that the establishment of an online channel erodes current offline business is not overwhelming. While only 1 in 6 large insurers experienced an erosive impact, as many small insurers as not experienced an erosive impact. Whether erosion is clearly attributable to the establishment of an online channel is multi-faceted and is likely dependent on a number of market factors not addressed in this research.

Taken together, the results in Tables 3 and 4 suggest that insurance management has experienced increased business activity by adopting an online channel that has not simply been treated as a substitute for traditional business activity. The economic experience is less clear and depends on the marginal profitability of the online customer vis-à-vis more traditional methods.



V. Findings: Technology within Operational Areas

An online channel and questions about its effectiveness is a major strategic interest of insurer management at a time when innovation pervades a variety of day-to-day operational activities. The opportunity to move away from a bricks and mortar office environment to a "virtual office" presents the possibility of significant cost savings for insurers, however it introduces concerns about employee productivity, effective communication and the value of an office work-setting. Fritz, Narasimhan and Rhee (1998) examined satisfaction among telecommuters vis-à-vis non-telecommuters and found telecommuters reported higher communication satisfaction, potentially alleviating upper management concerns about introducing a virtual work place environment. In our survey we were interested in how insurers viewed the virtual office concept. We found that only about half of our full sample of survey respondents indicated that the virtual

office concept is or has been important to their business strategy. Only a little more than 36% of small insurers have embraced the virtual office concept, while about 67% large insurers have done so.

While the virtual office and the opportunities inherent in the Internet and online services have a history, albeit relatively brief, a primary focus of this research is to report on management's view of technologies that are being driven in the current marketplace. We broke down the survey by asking participants to focus on three key insurance business processes that define an insurer and separate it from other financial services firms. While many insurers, particularly large insurers, would be more aptly described as offering a menu of financial services and products some of which relate to insurance, we limited our set of questions to those related to traditional insurance functions: marketing, underwriting and claims related technology.

Marketing

Our interest in the technological impact on marketing begins with how insurers view the development of a website as a way to market directly to consumers. Insurers were asked to assess this question by choosing a range of choices from “not significant at my company,” to “very large impact on value of our company.” In reporting the results we identified a small insurer by the smaller arrow () and large insurers by the larger arrow (). The impact varies considerably by size of insurer. Large insurers recognize that such development has been measurable while small insurers have not noticed a significant impact. No insurer in the sample responded that a site dedicated to direct selling to the customer has had a very large impact. By contrast, insurers appear to see more value in a website that, while focusing on the customer, serves the purpose of connecting the customer with an agent. Large insurers, on average, see the impact to be significant at their company, and small insurers recognize the impact tending toward at least

measurable and noticeable. Thus, while the Internet is perceived to convey marketing benefits to insurers, agents have not been substituted by this technological innovation.

M1: Development of retail website focused on direct marketing to consumer

Please choose only one of the following:		
1	Not Significant at my company	← 1.36
2	At least measurable and noticeable	← 2.50
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

M2: Development of retail website focused on consumer but connecting consumer with agent.

Please choose only one of the following:		
1	Not Significant at my company	← 1.91
2	At least measurable and noticeable	
3	Moderate, but not very large	← 3.83
4	Significant at my company	
5	Very large impact on value of our company	

Given agents remain important to the sales process, how does technology play a role in insurers training their agents? We asked respondents to assess three different forms of training delivery methods with their agents: webcasts, podcasts and personal digital assistants (PDAs). Oloruntoba (2006) defines and discusses a variety of current learning technologies. Webcasts represent “streaming video delivered online.” Podcasts and PDAs have the ability of being more mobile, and the functionality of a personal digital assistant taking the form of a “smartphone,” which is a “hybrid mobile phone/personal digital assistant.” By contrast, a podcast “is a method of distributing multimedia files.....using atom syndication formats for playbacks on mobile devices like i-pods and personal computers.”

M3: Training agents thru webcasts

Please choose only one of the following:		
1	Not Significant at my company	← 1.91
2	At least measurable and noticeable	
3	Moderate, but not very large	← 3.50
4	Significant at my company	
5	Very large impact on value of our company	

M4: Training agents thru podcasts

Please choose only one of the following:		
1	Not Significant at my company	← 1.09
2	At least measurable and noticeable	← 1.5
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

M5: Training agents thru PDAs

Please choose only one of the following:		
1	Not Significant at my company	← 1
2	At least measurable and noticeable	← 1.33
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

In our survey, the findings are clear that PDAs do not have a significant impact on how insurers train their agents. However, webcasts are important and among large insurers approach being significant sources of training on average. Podcasts are clearly not significant at small insurers and only slightly less insignificant at large insurers. Part of this explanation may reside in the fact that while a key strength of podcast technology is as a more mobile training tool compared to a streaming webcast, a mobile device is required to take advantage of the technology.

M6: Communication of any kind with agents using mobile data devices

Please choose only one of the following:		
1	Not Significant at my company	← 1.81
2	At least measurable and noticeable	← 1.83
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

The evidence is clear that marketing training via a handheld device does not get the attention of the insurance industry. We asked insurers to assess whether they had *any* communication at all with agents via a mobile data device and the average response indicated that such communication was only approaching being noticeable and measurable. Thus, the marketing impact of technology appears to be focused on linking customers with agents, a slow movement by the industry toward web-based agent training and little need or perceived value in communicating with agents via mobile devices.

Underwriting

We are next interested in how insurers use technology to gather information necessary to evaluate the risk profile of their insurance applicants. In an underwriting context, information feeds knowledge and offers an insurer the opportunity to a) gain comparative advantage over their competition, and b) narrow the asymmetry that often exists when insurance applicants know more about their intrinsic risk.⁷

Technology can serve a variety of points in the underwriting process so we were first interested in whether insurers acquired their information from agent input on a website or internal network, and whether customer applicants were permitted to self-input at least some of their underwriting information directly. The results indicate that agent web-based input of data has become adopted, on average, even among smaller insurers, and that 4 of 17 insurers responded that web-based input had a very large impact on the value of their company. Smaller insurers appeared to emphasize the web over an internal network on average compared to their larger counterparts.

⁷Readers are encouraged to read Deborah Smallwood's piece on how underwriting is changing, http://www.fairisaac.com/NR/rdonlyres/F1DFEA70-14D4-4A3E-A1EB-76B4DA78943B/0/Competitive_PandC_Underwriting_Tower_Group_Oct_2004.pdf

By contrast, customer entry of underwriting data has not gathered much traction at small insurers but has become at least noticeable among large insurers.

U1: Permit customer entry of some underwriting information via a website.

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	← 1.36
2	At least measurable and noticeable	← 2.67
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

U2: Permit agent entry of underwriting information via a website

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	← 3.16
3	Moderate, but not very large	← 3.72
4	Significant at my company	
5	Very large impact on value of our company	

U3: Permit agent entry of underwriting information via an internal network

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	← 2.63
3	Moderate, but not very large	← 3.33
4	Significant at my company	
5	Very large impact on value of our company	

Once the data is received by an insurer how is it evaluated? The utilization of an expert system to evaluate the underwriting data is somewhat dependent on the market niche of the insurer, for example, commercial underwriting is often more subject to human judgment. We were interested how a respondent viewed and implemented an expert system in their underwriting process and the average result across the full sample indicated that such a technology had at least a moderate impact. The result for large insurers tended toward a significant impact at these companies likely reflecting that major automobile insurers were included in this sample.

U4: Implemented the use an underwriting expert system

Please choose only one of the following:	
1	Not Significant at my company
2	At least measurable and noticeable
3	Moderate, but not very large
4	Significant at my company
5	Very large impact on value of our company

← 2.73
← 3.67

More specific technologies for gathering customer information include GPS mapping of property exposures, mileage monitors in automobiles and whether insurers encourage and rely upon their customer’s self-reporting of mileage. Both GPS mapping and mileage monitoring begin to encroach on the world of Telematics, where the combination of global positioning systems with wireless communication create a real-time, individual-specific set of metrics that can be evaluated by management to assess whether these risk-attributing metrics are correlated with actual losses.⁸ In effect, automobiles are outfitted with devices that gather and communicate driving data. If a driver uses their car to drive “to and from work” the ability to gather and communicate real time data would permit, say, the time of day when driving is occurring, the average speed at which the car is moving and the quantity of miles driven by day of the week. The number of new attributes that could be created for underwriting and pricing evaluation would be limited only by the creativity of management, and statistical evidence from the modelers that such attributes are valid. A key value proposition being the additional precision obtained in predicting future losses.

In our survey we focused on current practices of some insurers within the industry. The average insurer response to GPS mapping technology to help gauge property insurance exposure is having at least a noticeable effect, while mileage monitors in automobiles is not yet a significant practice among insurers. While insurers can utilize GPS mapping to help assess catastrophic

⁸Holdrege (2005) provides an insightful discussion on the basics of Telematics and how it can provide an insurer with strategic advantage.

exposure that can be used for “big-picture” management decisions, outfitting customer’s automobiles with devices is both costly and potentially perceived by the customer as privacy invading. Indeed, one of the issues raised by Holdrege and echoed by the insurance industry is whether privacy concerns will outweigh the actuarial justification for a more focused measure of loss-producing capability. One way around privacy concerns is self-reporting and our survey asked whether insurers might encourage Internet facilitated self-reporting of mileage by their insured customers. The results were not surprising given the degree of difficulty for insurers to independently verify individual mileage assessment *ex ante* loss. 16 of 17 insurers answered that such self-reporting was not significant at their company.

To round out the exploration of underwriting we were interested in whether underwriters were communicating with any other insurer party through the use of a mobile data device. While smaller insurers appeared more inclined to utilize this technology in contrast to large insurers, the overall results tend toward this communication path not being a very noticeable among insurance industry participants.

U5: GPS mapping of property exposures

Please choose only one of the following:		
1	Not Significant at my company	← 2.36
2	At least measurable and noticeable	← 2.66
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

U6: Utilize mileage monitors in cars

Please choose only one of the following:		
1	Not Significant at my company	← 1.09
2	At least measurable and noticeable	← 1.16
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

U7: Utilize self-reporting of mileage by consumers via a website

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	← 1.00
2	At least measurable and noticeable	← 1.09
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

U8: Communication of any kind with underwriting and another party using mobile data devices

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	← 1.36
2	At least measurable and noticeable	← 1.66
3	Moderate, but not very large	
4	Significant at my company	
5	Very large impact on value of our company	

Claims

Once marketing and underwriting turn a potential risk/business opportunity into a customer, the prospect of claims inevitably become the subsequent consideration. Effective claims management recycles information back to underwriters and actuaries when claims are handled in a timely and accurate manner. This integration of activities possesses much value-added potential. Within claims the “optimization proposition” is for insurers to accurately assess its true claim contractual obligation then pay the obligation in the appropriate time frame subject to customer satisfaction.

Historically, claims management has relied on a manual assessment of claim validity with quality reviews undertaken by manual review, too. Perhaps more than any of the other functional areas of an insurer, claims management has moved farther down the path of adopting technological

innovation.⁹ There is now the opportunity for insurers to not only effectively handle claims in real-time, but to gather information from such claims to make better future decisions.

Today, the process of adjusting a claim begins with an 800 number and insurers have the opportunity to handle claims and validate the accuracy of claim payments utilizing mobile hardware with a software interface that is provided by firms such as Marshall, Swift and Boeck (MSB) and Xactimate. These firms work as an electronic intermediary between the insurer and the adjuster. Once notified of an incident the insurer uploads claim opening data to the claim vendor's site and gives the field adjuster access. The field adjuster downloads the basic facts of a claim, investigates the claim, then uploads the results of the claim investigation back to the claim vendor's site. An advantage of electronic communication is that it permits the stocking of a data warehouse that can be mined for claim handling assessments, quality testing and adjuster performance review.

In our survey we were interested in how insurers utilize technology to process individual claims. The questions took respondents through the process beginning with whether they communicated with field adjusters via a cell phone when the claim was incurred. Large insurers, on average, reported that mode to be significant at their company while small insurers reported a more moderate response at their companies. Once the claim process had begun, we were interested in whether adjusters utilized digital photography and digital recorders to supplement a claim file. Overall results indicated that digital photography to be a significant and valuable resource to the insurer respondents. While digital recorders in the field document aspects of the event and thus play an important role for insurers, the overall average result was only moderate. The use of portable printers in the field to give customers an on-site estimate yielded a comparable result to digital recorders overall, and clearly plays a more important role among large insurer respondents that view portable printers as significant at their company. An obvious need for insurers that is enabled by

⁹I am grateful to the insights of David Repinski, President of Cunningham & Lindsay, N.A., for much of the background to this section.

technology is quick communication between the field and the home office. We wanted to know about the role of wirelessly-enabled laptops that permit adjusters to update an electronic file. We found that to be an important trend among all insurers with the average result falling between a “moderate” impact at their company and a “significant” impact at their company.

C1: Communicate with adjuster via cell phone when notified of a new incurred claim

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	← 2.72
3	Moderate, but not very large	
4	Significant at my company	← 4
5	Very large impact on value of our company	

C2: Digital photography included in claim file to help assessment

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	
3	Moderate, but not very large	← 3.73
4	Significant at my company	
5	Very large impact on value of our company	← 4.5

C3: Use of laptops with wireless technology so field reps can update electronic file

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	
3	Moderate, but not very large	← 3
4	Significant at my company	
5	Very large impact on value of our company	← 4.67

C4: Use of portable printers on site so customer receives estimate in hand

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	← 2.18
3	Moderate, but not very large	
4	Significant at my company	← 3.67
5	Very large impact on value of our company	

C5: Use of digital recorders to take a statement in the field

<u>Please choose only one of the following:</u>	
1	Not Significant at my company
2	At least measurable and noticeable
3	Moderate, but not very large
4	Significant at my company
5	Very large impact on value of our company

← 2.55
 ← 3.5

The use of external software providers to help process claims electronically is more in favor compared with internally developed methods. 9 of 17 respondents reported that internally developed software was not significant at their company while overall average results indicate that internally developed methods were reported to be somewhat more than “not significant.” By contrast, the average overall value for this choice was substantially below external products such as MSB and Xactimate that have had at least a moderate impact on the value of the insurer respondents.

C6: Use of MSB, Xasctimate or other external vendor software in measuring value of property claim

<u>Please choose only one of the following:</u>	
1	Not Significant at my company
2	At least measurable and noticeable
3	Moderate, but not very large
4	Significant at my company
5	Very large impact on value of our company

← 2.81
 ← 3.67

C7: Use of internally developed software to measure value of property claim

<u>Please choose only one of the following:</u>	
1	Not Significant at my company
2	At least measurable and noticeable
3	Moderate, but not very large
4	Significant at my company
5	Very large impact on value of our company

← 1.63
 ← 2

How has technology permitted the centralization of call centers? The results from our sample indicate that centralization has had a significant impact on insurer value, particularly among

large insurers for whom centralization is revealed as an important consideration. Even among our defined sample of “smaller” insurers we found that centralization has had a moderate impact on insurer value. Finally, we were interested about the role and use of a high technology vehicle in managing claims and communicating via satellite technology. Not surprisingly, this technology has been embraced by larger insurers that have a focus on personal lines, and the overall impact on company value is slightly above the moderate level. Among smaller insurers the impact is nearly measurable and noticeable. The use of field-based global positioning systems to help locate an insurer’s customers does not play a significant role at smaller insurers with 7 of 11 respondents indicated that these devices are not significant at their company. Larger insurers rate the impact as only moderate.

C8: Centralization of call centers

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	
3	Moderate, but not very large	← 2.91
4	Significant at my company	
5	Very large impact on value of our company	← 4.67

C9: In catastrophes use of a high-technology vehicle that communicates via satellite technology

<u>Please choose only one of the following:</u>		
1	Not Significant at my company	
2	At least measurable and noticeable	← 1.81
3	Moderate, but not very large	← 3.33
4	Significant at my company	
5	Very large impact on value of our company	

C10: Use of portable global positioning systems when difficult to locate damaged property

Please choose only one of the following:	
1	Not Significant at my company
2	At least measurable and noticeable
3	Moderate, but not very large
4	Significant at my company
5	Very large impact on value of our company

← 1.81
← 3

Integration

As we have seen thus far not all aspects of the insurance industry’s operational make-up is technology enabled and the extent to which an insurer’s processes are digitized and connected depends on size. We expect that economic gains from utilizing technology in an information driven business can be substantial and enhanced if the technology is integrated across these processes. We inquired among survey respondents if and how they integrate customer data across their property and liability lines of business by asking respondents to choose one category that best describes their insurer.

**Table 5
Integration of Customer Data**

	Percentage response
We presently find it difficult to integrate customer data across functional areas	5.8%
We presently find it difficult to integrate customer data across functional areas but plan to do so within the next 3 years	23.5%
We presently integrate customer data across marketing and underwriting, but not claims	5.8%
We presently integrate customer data across underwriting, claims and marketing	64.7%

The results in Table 5 show that nearly 65% of insurer respondents do integrate their customer data across marketing, underwriting and claims. An additional 23.5% of insurers expect to accomplish

this task within three years. Whether an insurer is small or large, integration appears to be both key and workable. Since many insurers are multi-line we were curious about the ability of insurers to integrate their customer data on the Property and Liability (P&L) side to the Life and Health (L&H) side of their businesses. Only 29% of our respondents had an L&H presence. Among these multi-line insurers, *none* of them have a P&L system that “easily interfaces” with their L&H system.

The likelihood of moving toward complete integration of data through businesses processes could be enhanced because of the economics of service-oriented architecture or SOA. As defined by He (2003) SOA “provides for a loose coupling among interacting software agents.” By contrast, the practice of insurers evident today is “still focused on buying point solutions at the LOB [line of business] level.” (Gorman and Macauley (2007)) The distinction drawn between SOA and alternative IT solutions is metaphorically explained by He,

“Take a CD for instance. If you want to play it, you put your CD into a CD player and the player plays it for you. The CD player offers a CD playing service. Which is nice because you can replace one CD player with another. You can play the same CD on a portable player or on your expensive stereo. They both offer the same CD playing service, but the quality of service is different. The idea of SOA departs significantly from that of object oriented programming, which strongly suggests that you should bind data and its processing together. So, in object oriented programming style, every CD would come with its own player and they are not supposed to be separated. This sounds odd, but it’s the way we have built many software systems.”

One of the compelling features of SOA is in its flexibility it captures complexities that enable insurer management to enhance the value of information while lowering processing costs. We asked survey participants their views about how they view SOA contributing to their management strategy. We found the prospect of widespread SOA adoption persuasive as nearly 73% of small insurers and 67% of large insurers have SOA as either a current or planned approach to their technology infrastructure. During the survey, insurers were given the chance to offer their view about the benefits of SOA to their firm. One respondent noted, that SOA would “foster the environment

needed to effectively create, utilize, promote, and support reusable artifacts (i.e. use cases, process maps, data models, patterns, software components, test cases, etc.), and to provide centralized support for communications.” Similarly, one insurer noted that “we expect to have business logic and functionality written once and maintained in single software modules for ease of maintenance and reuse.” While one insurer summarized SOA advantages in terms of cost reduction noting that their company would be able to have “efficiency gains in staffing,” and that now there would be a “single portal for all agency and consumer transactions,” two other insurers expressed a top line impact, noting that speed to market would increase when changes have to be made quickly and that SOA permitted “rapid deployment of new applications.” One notable barrier to the widespread adoption of SOA, as noted by Gorman and Macauley (2007), is the tension that exists between a lack of standards or comparability in data and technology from one insurer to the next, and the economies necessary for third-party vendors to come up with effective and creative SOA applications.

VI. Concluding Remarks

This research has reported on how technology is currently shaping business practice in the insurance industry. Innovation has been underway for some time and respondents have attributed electronic communication of business processes, such as agent and consumer portals and the paperless office, as key implementations of technology that have had a significant impact on company value over the past 10 years.

While the findings reveal more recent pervasive technology utility within marketing, underwriting and claims, a significant finding is the extent to which insurers are embracing integration of customer data across their traditional practice areas which is facilitated by technology advances coupled with the prospects for SOA. The internal synergy helps management create an information currency that brings new aspects of business within their control for evaluation and

strategy. How management effectively utilizes today's technology to streamline existing processes is one of the value increasing opportunities that will separate winners from losers in the future.

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