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Road to Recovery

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How Data Analytics is Driving Outcomes in Australian Injury Schemes

Prepared by Niki Appleton, Amanda Aitken and Yifan Fu

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Institute of Actuaries of Australia
ABN 69 000 423 656
Level 2, 50 Carrington Street, Sydney NSW Australia 2000
t +61 (0) 2 9239 6100 **f** +61 (0) 2 9239 6170
e actuaries@actuaries.asn.au **w** www.actuaries.asn.au

Abstract

The purpose of this paper is to explore case studies where Injury Schemes have successfully used data analytics to drive scheme outcomes, whether they be improved safety, faster recovery, better customer service or greater financial sustainability. We will explore what data analytics means to these schemes, how they are using it to help them achieve their goals and challenges they have faced along the way.

Keywords: data analytics, Injury Schemes, scheme outcomes, case studies

Introduction

Data analytics is becoming big business for many different professions and industries. Actuaries are also keen to play a role in this exciting new field of work. We thought it would be interesting to explore how Injury Schemes are using data analytics to achieve positive outcomes.

Data analytics can mean different things to different people. Some argue that unless you're using machine learning and software such as Hadoop, you're not really involved in data analytics. Others argue that even the simplest Excel model can be considered data analytics if it provides actionable insights for its users. In our discussions with Injury Schemes, we deliberately avoided defining data analytics in order to explore the different types of analysis the schemes are undertaking.

We commenced our research with a short survey of 18 Australian and international Injury Schemes to explore how they are using data analytics to achieve scheme objectives, challenges and lessons learnt along the way and opportunities identified for further strategic uses of data analytics. The high level findings from this survey are presented on the next page. We are grateful to individuals from the following schemes for participating in our survey:

Figure 1 - Survey Participants

We then spoke to a number of these schemes who generously shared details of projects where data analytics was an integral component. From these discussions, we selected four case studies to include in this paper as they demonstrate how data analytics is used across different scheme functions such as claims management, customer service, health and safety and return to work. Each case study uses a range of different types of information and complexity of analytical methodology and tools.

Summary of Survey Findings

This section summarises the high level findings from our survey of 18 Injury Schemes. The complete survey and respondent answers are set out in Attachment 1.

Experience and Software used

14 of the 18 schemes surveyed classify themselves as regular or advanced data analytics users and rely on a combination of in-house and out-sourced analytics.

Five schemes classified themselves as advanced data analytics users, adopting 5–10 different software packages and the majority (12) of other schemes (limited users and regular users) adopt on average 4 software packages per scheme.

A scheme's assessment of data analytics experience appears to impact the software they use. Traditional tools such as Excel, SAS, SQL and Access are still preferred by schemes classifying themselves as limited or regular users of data analytics. More experienced users are adding newer, more advanced tools such as R and Tableau to their toolkit.

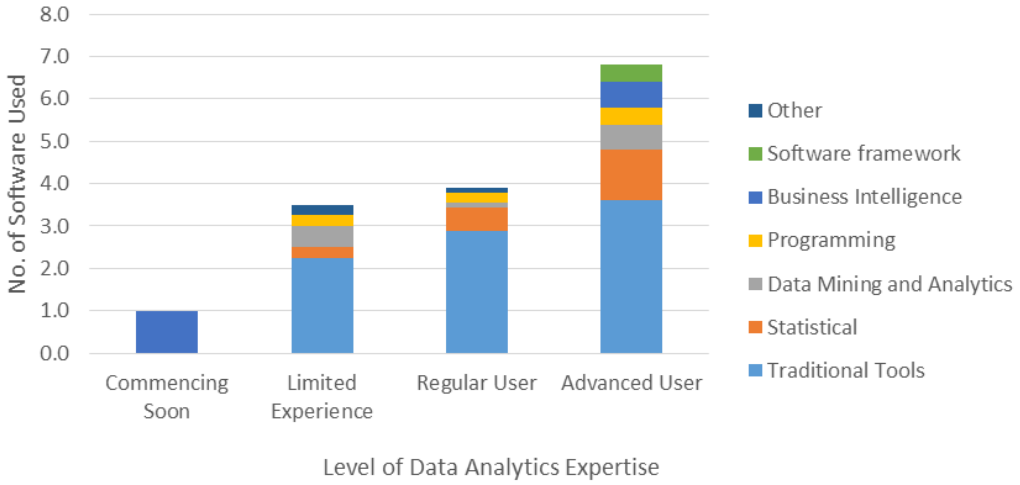
Figure 2 - Data Analytics Software Packages used by Injury Schemes

Scheme	Excel	SAS	SQL	Access	R	Tableau	Java	SPSS	EMBLEM	Hadoop	Python	IBM Cognos	Other[1]	Total
A	*		*	*	*			*				*		6
B	*	*	*	*	*	*	*		*	*	*			10
C	*	*		*									*	4
D	*	*	*				*	*						5
E	*		*	*										3
F	*	*		*	*	*			*					6
G	*	*		*										3
H	*	*	*	*								*		5
I	*	*	*		*									4
J	*	*												2
K	*	*	*		*						*			5
L	*	*	*		*	*		*						6
M	*	*												2
N	*	*	*				*						* *	6
O	*	*	*	*		*				*			*	7
P	*		*	*										3
Q													*	1
R	*	*	*		*								*	5

[1] Other - Spot Fire or JIRA or Qlikview or Orange or Busines Objectives or Mapping

advanced users | regular users | limited experience | commencing soon

Figure 3 - Data Analytics Software Packages used by Injury Schemes



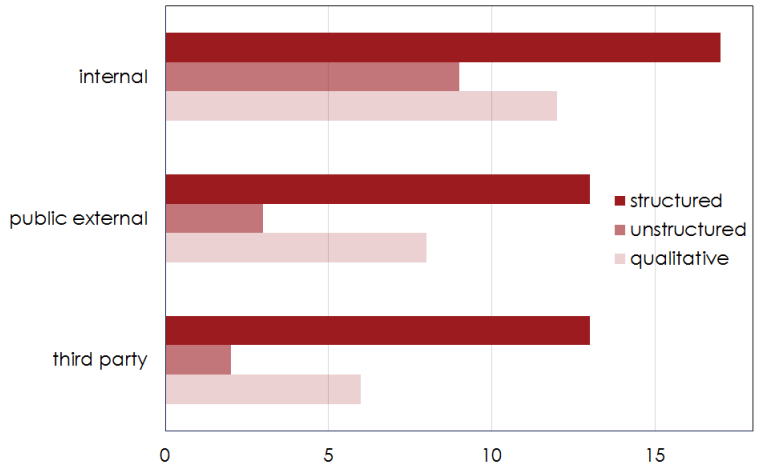
Applications

Data analytics is being used in areas such as pricing, claims management, fraud detection, reserving, marketing and customer service. Pleasingly, actuaries are involved in data analytics within 14 of these schemes, working alongside other professionals such as business analysts, statisticians, data scientists, IT professionals and mathematicians. Many schemes noted that the users of the analytical outcomes span the organisational structure from floor up to Board level.

Data Sources

While most schemes rely on internal, structured data, a number are also experimenting with external and unstructured data including both publically available and third party provided data. Qualitative information such as subject matter expertise was flagged as another major source of information for their analysis (see the Opportunities section for more detail).

Figure 4 - Data Sources used by Injury Schemes



The remaining sections of this paper provide more information about how these schemes are using data analytics to achieve scheme outcomes.

Case Study 1: Improving Common Law Claims Management

"To be, or not to be, that is the question." That is indeed the question that claims staff at the Transport Accident Commission (TAC) must consider with the help of their analytical tool called "Hamlet", when they review the merit of new common law applications.

Business issue

The TAC has a mix of both no-fault benefits and common law, with the latter for serious injury only. TAC found their common law experience was escalating with a greater proportion of clients pursuing common law damages payments, increasing costs and delays in settlement.

Purpose of project

The aim of the project was to build a tool to improve the review process of new common law lodgments and enable:

- faster benefit delivery for clients entitled to common law damages; and
- better use of limited resources in managing common law costs.

Outcome and product

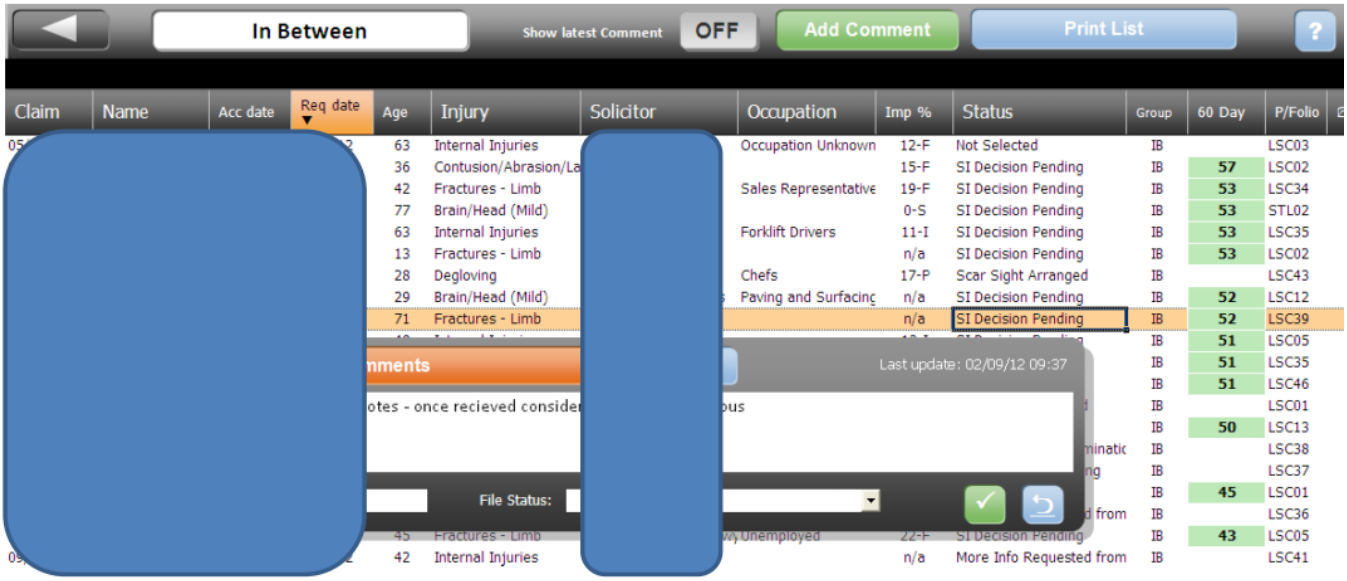
Actuaries and business analysts at the TAC built a common law streaming desktop tool in 2010, called Hamlet, which predicts the likelihood of injured clients receiving a serious injury grant at common law[i].

Hamlet has helped TAC to achieve a number of outcomes, including reducing settlement times for clients to the lowest experienced in 10 years.

The analytics

The analysis combined a "gut feel" approach to identify potential predictive data fields with a multi-variate logistic regression model to test the predictive ability of the identified fields. The model was built in SPSS and SAS and implemented in Excel using macros to create a user friendly interface.

Figure 5 - Hamlet screenshot



Building of Hamlet commenced in 2009. It was implemented as a desktop tool in 2010, refreshed in 2012 and further expanded in 2014.

Reflections

TAC attributes much of the success of the model to the collaborative approach adopted, which involved actuaries and business analysts working alongside subject matter experts to test both the sensibleness of the model and the look and feel of the end product. This lead to a high level of business buy-in, from the floor right up to Board level, when it came time to implement the model.

TAC appear to have successfully transformed the output from a complex model into an actionable tool, enabling TAC to improve its claim management of common law claims.

Case Study 2: Improving Client Service by Streamlining Treatment Approvals

"It is not all about the numbers", as demonstrated by the WorkSafe Victoria project to improve client service, streamline treatment approvals and reduce the impact of "red-tape".

Business issue

A number of scheme stakeholders were dissatisfied with "red tape"[ii] in the claims management process. This issue was on the State government's radar and reducing red tape became one of the Scheme's key strategic goals.

Purpose of project

This project was designed to respond to this stakeholder dissatisfaction.

The main aims of the project were to improve decision making timeframes for treatment services that would ultimately be approved anyway to:

- improve the service experience for workers;
- reduce red tape for providers; and
- reduce workload and enable more autonomy for case managers.

Outcome and product

The "product" included a matrix of services where a different approval process was developed. This required policy changes to be made which included changes to workflow, process, legal requirements and IT systems. Extensive training material was produced to support the managing agents.

The project did achieve reduced decision timeframes, obtained positive case manager feedback and improved service scores from injured workers involved in this process.

The analytics

A number of steps were involved, with different iterations of analysis undertaken at each step. The project took nine months from outset to implementation.

Figure 6 – Streamlined Treatment Process Flow

WorkSafe sought stakeholder feedback at the outset to identify the key areas to investigate. Analysis was then undertaken to drill down into these areas looking for the "quick wins": high volumes of services that ultimately were paid. Some text mining and input from internal subject matter experts and medical specialists was used to identify specific service areas, such as particular types of surgery.

Worksafe consulted further with their large number of stakeholders to identify potential risks, evaluate and then address them. One example given was evaluating the financial risk to the scheme of the policy changes.

A number of different sources of data were incorporated into the analysis including information from the payment and invoicing system, treatment request and processing database, Service Survey database and audit reports. SAS was used to extract and manipulate data. The analytics was undertaken in Excel.

Finally evaluation processes were developed to understand the impact of the project, whether the improvement was sustainable and further areas of opportunity.

Reflections

This WorkSafe Victoria project was interesting because it demonstrated that to achieve its outcomes "it was not all about the numbers". The analytical methodology did not appear to be overly sophisticated. However WorkSafe noted that their biggest challenge was influencing the business and agents and getting their buy-in. The high level of stakeholder engagement and qualitative input appeared to be key facets to the project's success.

Case Study 3: Improving Health and Safety Outcomes for Injured Workers

How can .Net and a charting tool such as Infragistics help improve occupational health and safety? This was an area Canadian OHS regulator, WorkSafeBC explored in developing their Employer Safety Planning toolkit.

Business issue

With a strong focus on injury prevention, WorkSafeBC were keen to explore ways to assist employers gain executive support for making health and safety improvement investments.

Purpose

The main objective of this project was to reduce injuries by improving information available to employers concerning their accident and injury records and the related costs and impacts to their insurance premiums and therefore help them make the case for investment in safety improvements.

Outcome and product

WorkSafeBC developed an Employer Safety Planning toolkit that provides every employer in BC, Canada, with a detailed summary of their recent experience in risk, severity and cost of claims. The tool also includes "what if" scenarios to show the impact of improvements on an employer's insurance costs.

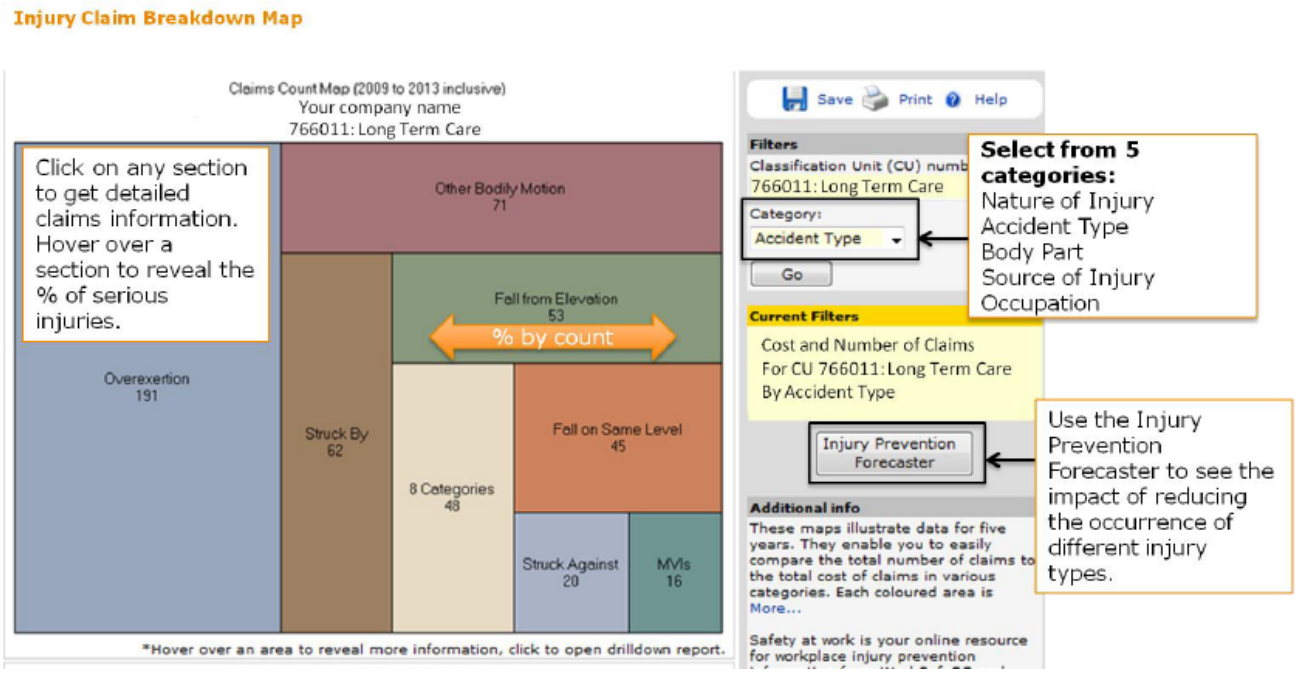
WorkSafeBC reported that the tool has been widely adopted by Canadian employers with several positive testimonials. One employer used the tool to identify that lifting of kegs was a major contributor to their claim frequency and used this information to justify the purchase of 25 mechanised keg lifters, demonstrating that the cost of these claims was approximately 30 times the cost of the lifters. Following implementation of the keg lifters, they reduced their claim frequency of manual lifting injuries from 17 p.a down to 1, also resulting in financial savings.

The analytics

WorkSafeBC utilizes an operational data warehouse to pull data together from various sources such as workplace inspections, prevention activities and insurance payments. A custom built tool on .Net is then used, along with charting tool Infragistics, to present the reporting online. It enables employers to compare their own performance to their peers and to examine how operational and health & safety changes might impact their future premiums.

The software used helped WorkSafe BC create a tool that is easy to navigate and enables employers to "drill down" to better understand their claims experience. The screenshot below shows that for this particular employer, a high percentage of long term care claims are caused by "overexertion". The employer can then drill down to analyse overexertion claims by variables such as nature of injury, source of injury and occupation.

Figure 7 - Employer Safety Planning toolkit screenshot



The tool has been through 3 iterations in 3 years. WorkSafeBC are currently experimenting with Tableau Public and Hadoop to find ways for their business intelligence team to take more ownership of future model enhancements. Tableau has advantages in bringing many data sources together and showing different iterations of data on the go. Hadoop, being a cloud based system, has strengths in overcoming storage and data processing issues.

Reflections

Whilst this project didn't appear to involve sophisticated analytics, the toolkit interface built and output produced provide a product that makes it easy for employers to understand their performance. This project is an example of data analytics methodology not necessarily needing to involve complex modelling to have a useful impact and address the business issue. It showed the value of using some newer analytical tools (.Net and Infragistics) to produce an actionable solution.

Case Study 4: Improving Return to Work Service Provision

"Which provider is the best?" – a seemingly simple question, but with many complex underlying considerations and interactions. ReturnToWork South Australia (ReturntoWorkSA) developed a 5 star rating system to answer this question.

Business issue

ReturntoWorkSA did not have an objective way of measuring performance of individual return to work service providers, nor a process to identify areas these providers should then focus on improving.

Purpose of project

The business objective was to build a tool with a high level of integrity, to measure performance and display the output in a simple way. The purpose of the tool was then to enable management to discuss performance with individual providers, including specific opportunities for improvement.

Outcome and product

ReturntoWorkSA developed a model, CAPO, to compare approximately 30 return-to-work service providers, examining their performance across cost, durations and return-to-work outcomes and adjusting for different portfolio mixes and claim characteristics (e.g. portfolios with different claims management requirements).

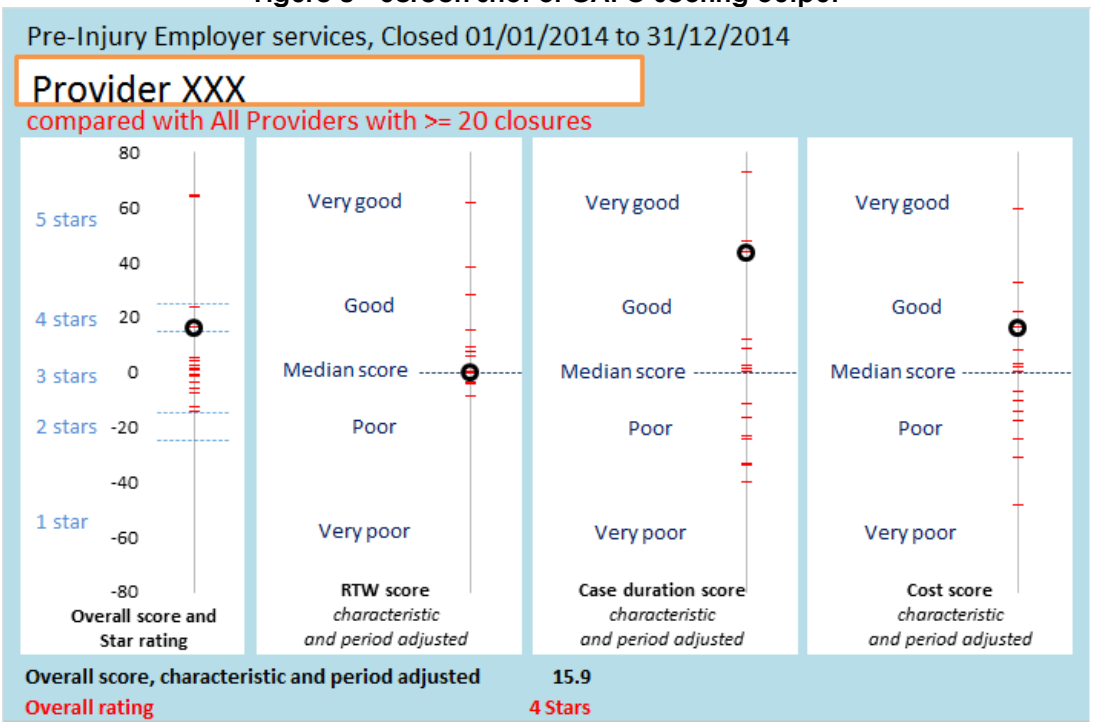
CAPO produces a 5 star rating system of the service provider performance that is distributed to management, claims agents and service providers.

The analytics

A team of statisticians, ReturntoWorkSA management, and ReturntoWorkSA return-to-work experts built CAPO using SAS, Excel and Tableau. There were many iterations of the analysis and it took several years to complete the rating system tool. The analytics was complex because it was required to simultaneously adjust for differences in provider portfolios, whilst measuring performance objectively. External consultants were used to verify the statistical analysis.

ReturntoWorkSA found the combination of software worked well and efficiently - SAS was used for data extraction and statistical modelling, in particular utilising the generalised linear modelling component and a range of extra modelling functionalities. Tableau was used for presentation of modelling diagnostics (mainly histograms and scatter plots). Using these two packages together involved an iterative process enabling models to be changed as data was refreshed and histograms/plots were updated. Excel was used for final calculations and presentation.

Figure 8 - Screen shot of CAPO scoring output



Reflections

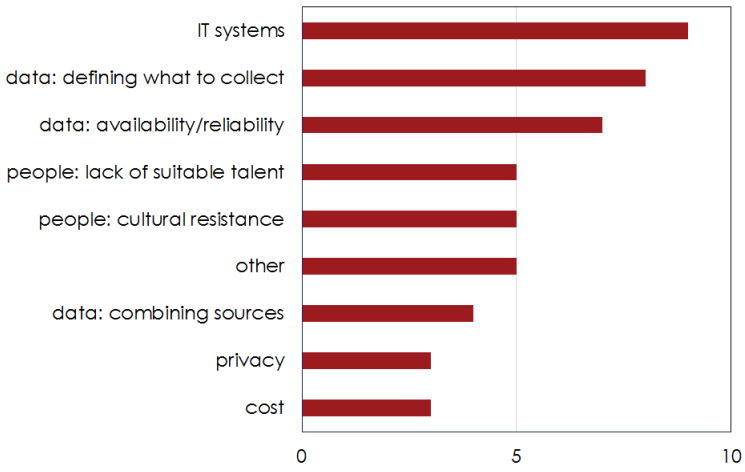
ReturntoWorkSA reflected that their biggest hurdle was taking the findings from the complicated methodology and presenting them in a simple, easy to understand way that could then be actioned. Also to get buy-in and acceptance from the providers of a "black box" model was difficult, particularly when defending the integrity of results to those providers with a poor star rating who believed they should have received a higher score.

It appears there were a couple of factors key to the success of this project, including the scheme's focus on developing a useable simple output, Tableau's usefulness as a communication tool and using external consultants to verify the rigor of the model.

Challenges and lessons learned

Figure 8 sets out a number of different challenges noted by the 18 schemes surveyed:

Figure 9 - Top 3 Data Analytics Challenges faced by Injury Schemes



Issues relating to ***IT systems*** and ***data*** ranked as the highest challenges. Other challenges included resourcing (cost and people), cultural and stakeholder resistance, privacy and regulatory barriers, deciding what to examine and being able to convert analysis into something useful that can actually be implemented. We discuss several of these in more detail below.

IT systems

IT system related challenges include having sufficient capacity to keep up with data processing demand, enhancing models in a timely, cost efficient manner and the high cost of more sophisticated software packages, particularly for smaller schemes.

IT system problems encountered in the middle of a data analytics project can result in significant project delays. WorkSafe Victoria noted that unforeseen changes in their case management system, required to implement the model, outlined in Case Study 2, held up implementation of the project by a couple of months.

Schemes identified that upfront involvement of the IT department helps identify any system issues as early as possible and assists in planning for any increased demand.

Data

Some of the key data challenges identified were having the foresight to know what to collect, the availability of reliable data, being able to combine multiple data sources without losing too much valuable data along the way and being able to manage the large volumes of data often collected by these schemes.

While having access to ***multiple data sources*** can increase insight derived from the analysis, it can also lead to the analysis becoming unwieldy and error prone. Often, a balance needs to be struck between accuracy and simplicity: ACC NZ found that sometimes simpler datasets and models were more impactful.

Non-structured data (eg open-field text format) can create challenges in converting this information into workable (structured) data formats. WorkSafeBC highlighted that keeping analysis current is another challenge; often by the time analysis is finalised, the data is out of date.

The ***emergence of software*** with open-source, cloud based functionality, such as Hadoop, may help schemes to overcome data volume, structure and processing issues in the future (several schemes, such as WorkSafeBC, are already trialing Hadoop now).

Schemes noted that ***qualitative information***, such as subject matter expertise, is important as it can help to provide a clear understanding of how data is stored and how scheme processes impact data. For example, in measuring return to work, it is important to understand the linkages between an injured worker returning to work, weekly benefit payments ceasing and medical certificate information being updated.

Cultural and stakeholder resistance

Buy-in was seen by many of the surveyed schemes as a critical element in achieving successful project outcomes; getting the right people involved up front and particularly getting the support of senior leadership. ACC New Zealand found that having a culture driven from the top empowered analytics driven decision making and innovation.

Consultation and engagement with many stakeholders is important to ensure support, particularly if the project requires a cultural change. The WorkSafe Victoria project outlined in Case Study 2 required a new approach to decision making. Involving various stakeholders, listening to their concerns and addressing identified risks enabled the project to move forward successfully.

Effective communication to obtain stakeholder buy-in can be achieved by:

- focusing on ***high level messages*** and not getting absorbed in the detail;
- user testing throughout to make sure a ***beneficial product*** is built and will be used;
- employing ***flexibility in communication*** styles (eg presentations, one-on-one and group discussions); and
- incorporating ***other factors***, such as reputational risk, into the presented solution.

Interestingly, WSIB in Canada noted that as the analytics team gained credibility, buy-in increased, but so too did demand. With increased demand, sometimes important components such as documentation do not get adequate priority.

Privacy and regulatory barriers

While the potential of utilising and combining various data sources is enormous, it also creates privacy concern for some stakeholders. This is a particular issue for Injury Schemes that typically have access to a lot of personal details.

As schemes engage more and more in analytics, privacy and the appetite for information are often competing forces. On the one hand, various privacy laws

currently restrict insurers from doing things like using unique customer identifiers to join internal and external data sets together (Brindley, 2014). However, it is likely that insurers will become more and more creative in being able to navigate their way around these laws to be able to, for example, use social media posts to better price insurance products (Enthoven, 2014).

In overcoming potential privacy issues, NDIA emphasized the importance of proving data is being used legitimately and sensitively, controlling access to information and aggregating information when showing it to wider audiences.

Expertise

Data Analytics naturally requires mathematical, statistical and modelling skills. It also requires the ability to use new emerging software such as Hadoop, Qlikview and Orange to maximize the analysis. However the required skill set is broader than this. NDIA realised that they needed people who could not only understand the analysis, but could also think laterally through different implementation options and could participate in negotiations and engagement with key stakeholders.

While schemes identified a number of challenges in using data analytics, they also highlighted many opportunities that data analytics presents. These are discussed in the next section.

Further Opportunities

Based on the survey responses and following one-on-one discussions with a number of schemes, several areas of further opportunity were identified. Some are specific to Injury Schemes, while others are applicable to the wider general insurance industry. We discuss several of these opportunities below.

Extending analytics to other scheme functions

Many schemes are already using data analytics in areas such as pricing, reserving and claims management. Extending analytics to other areas such as injury prevention, fraud detection, customer service, marketing and human resource planning can provide quick wins by leveraging existing in-house analytical skills and resources to provide valuable new insights. For these non-traditional analytical areas, data is often available and structured to some extent. The project could be quite small, need not involve heavy investment in either new software or additional resources and can serve as a good sample case to convince management of the benefits of future data analytics investment.

An interesting example is the fraud analysis conducted by AXA UK. This model flags and initiates investigation into potential fraudulent claim trends for networks of individuals and motor garages. AXA UK is applying this model both for claims from existing policies and at the point of purchase to improve their underwriting decisions.

Better integrating data sources

Traditionally analytics has been bound by the restrictions of available data. Those boundaries are now being lifted with schemes experimenting with the use of multiple disparate data sources; internal data, external data, structured or unstructured, web posts, internet news articles and live social media all form part of the broad data resources available for analysis (subject to privacy restrictions as outlined in the previous section).

For example, TAC mentioned that they are working on linking health (including psycho-social) issues identified at claim assessment to better predict future medical service needs. WorkSafe Victoria would like to combine claims data with customer service feedback for a better understanding of claim profiles and to produce early warning flags, enabling better, earlier triage of claims.

Schemes are also experimenting with both external and unstructured data sources. WorkSafeBC has launched a project with a local university to identify emerging health and safety risks based on news stories. They used this analysis to identify risks related to use of shipping containers for secondary purposes (e.g. storage of chemicals which may lead to an explosion). The TAC uses data from multiple external sources such as the Victorian State Trauma Registry, police, ambulance services and hospitals.

Using new tools and software

Data analytics brings a series of new software and tools to the analysts' possession. Some new tools, such as Tableau, Hadoop and Salford Systems were developed in the data analytics field with far advanced functionalities compared to traditional analytical software such as Excel and SQL.

New tools and software such as web based client portals and visual output displays are continuously being developed and implemented to better gather data, integrate systems, improve timeliness of analysis and to create effective and efficient delivery of results, suitably tailored to different audiences.

For example, WorkCover QLD is using Qlikview, which enables them to relay key messages simpler and more visually on the go. In Case Study 3, WorkSafeBC's web based portal and .NET framework engine not only aims at better results communication and flexibility of customised outputs but also aims to provide the most up-to-date diagnostics based on the latest data available. Other survey respondents mentioned the future use of automated decision making tools; for clients who wish to achieve a certain outcome, the system will automatically provide several pathways to consider based on the live inputs of the individual.

With so many software options now available, it can be difficult for new users to know where to start. If you're interested in learning about the relative advantages and disadvantages of some of these options, see Hugh Miller's excellent presentation from the Actuaries Institute's 2014 General Insurance Seminar (Miller, 2014).

Learning from other organisations

Commercial organisations such as supermarket chains are very customer centric with a good working knowledge of their customers' needs. They want their customers to visit their stores and buy their products and are using data analytics at an ever increasing level of sophistication to help them achieve these outcomes. Injury Schemes, on the other-hand, want to help their "customers" recover from injury and regain independence from the Injury Scheme. Injury Schemes could learn a lot from the customer relationship analytics used by supermarket chains and social media sites.

Injury Schemes often analyse their experience by either groups of clients injured in the same year, by benefit type (eg medical services, income replacement payments or Common Law settlements) or by provider networks. Perhaps a more customer centric focus, such as gaining a better understanding of who is claiming, why they are claiming and what their past claim experience has been could provide new insights and a better understanding of how to improve recovery and independence outcomes.

Conclusion

Amongst schemes surveyed, there are a range of "data analytics" definitions and a variety of tools used. Some schemes have started to examine different types of information (eg structured and unstructured) and others have tapped into external sources of data and qualitative input to overlay their internal data. The four case studies showed a range of modelling complexity was undertaken. Despite some of these differences, a key theme that emerged was that data analytics includes employing a large volume of information, analysing that to provide insights and then transposing those insights into actionable outcomes for the scheme.

Data analytics is already being used to drive outcomes in areas such as claims management, service, injury prevention and return to work. Many different professionals are involved in schemes' analytical projects; actuaries work alongside business analysts, statisticians, data scientists, IT professionals and mathematicians. Interestingly, the identified desirable skill set for successful data analytics extends beyond strong analytical skills and includes lateral thinking, business acumen, negotiation and engagement.

Many challenges were noted, including IT system constraints, privacy issues and reliability of data. Key lessons learnt include the importance of early and continuing stakeholder engagement through clear and effective communication and the need for balance between accuracy and simplicity and between quantitative data and qualitative input. Issues such as reputation risk also need to be considered.

Potential future opportunities include applying analytics to other areas of a scheme such as human resources and marketing, using a wider variety of data sources and learning from what other organisations such as supermarket chains and social media networks are doing to improve customer relationship management.

It seems that Injury Schemes across Australia and overseas would benefit from continuing to share their data analytics learnings with each other. It will be interesting to see what further developments occur before the next Injury Schemes Seminar in 2017!

Attachment 1 – Survey Questions

Survey responses are indicated by the numbers in brackets following each answer.

Q1. Which of the following do you consider to be data analytics?

a. analysing small structured data sets (17)
b. analysing big unstructured data sets (15)
c. linking multiple/alternative data sources (17)
d. text mining (17)
e. time series analysis (16)
f. using statistical techniques (eg regression) (16)
g. other (2)

Q2. Where does your organisation sit on the data analytics spectrum?

a. not considering/unsure (0)
b. thinking about (0)
c. planning to commence (1)
d. used only a handful of times (3)
e. regular user (9)
f. advanced user (5)
g. other

Q3. How is your data analytics performed?

a. in-house (5)
b. in-house and out-sourced (13)
c. out-sourced (0)
d. other (0)

Q4. What data analytics software do you use?

a. Access (9)
b. EMBLEM (2)
c. Excel (17)
d. Hadoop (2)
e. Jaspersoft (0)
f. Java (3)
g. SAS (14)
h. Scala (0)
i. SPSS (3)
j. SQL (12)
k. Python (2)
l. R (7)
m. Revolution (0)
n. Salford Systems (0)
o. Tableau (4)
p. WPS (0)
q. other (7)

Q5. Which data sources does your organisation use for analysis?

a. internal structured (17)
b. internal unstructured (9)
c. internal qualitative (12)
d. external structured (13)
e. external unstructured (3)
f. external qualitative (8)
g. third party structured (13)
h. third party unstructured (2)
i. third party qualitative (6)
j. other (0)

Q6. How applicable is data analytics in your organisation for the following areas? (0 - n/a, 1 - not useful, 2 - haven't considered, 3 - considering, 4 - undertaken a project, 5 - using regularly)

a. pricing (4)
b. reserving (3)
c. underwriting (2)
d. claims management (4)
e. marketing (3)
f. customer service (3)
g. fraud detection (4)
h. other (1)

NB: The survey response shown for this question is the average across all respondents.

Q7. Who are the main users of data analytics output in your organisation?

a. Board (8)
b. senior executives (13)
c. management (17)
d. everyone (6)
e. external stakeholders (8)
f. other (5)

Q8. Who is involved in data analysis in your organisation?

a. actuaries (14)
b. business analysts (15)
c. data scientists (9)
d. economists (3)
e. engineers (3)
f. IT professionals (8)
g. statisticians (13)
h. mathematicians (7)
i. other (4)

Q9. What are the top 3 challenges your organisation has faced in using data analytics?

a. availability of reliable data (7)
b. cost (3)
c. combining data sources (4)
d. cultural resistance/management buy-in (5)
e. defining what data needs to be collected (8)
f. IT infrastructure/systems (9)
g. lack of suitable talent (5)
h. managing data volume (2)
i. privacy issues/social acceptance (3)
j. regulatory approval (1)
k. other (2)

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[i] To be entitled to a common law damages payment in the TAC scheme, the applicant must be deemed "seriously injured" and have someone else at fault. A number of considerations are taken into account in determining "serious injury" including

- A permanent impairment of 30% or more
- Serious long-term impairment or loss of a body function
- Permanent serious disfigurement, such as scarring
- Severe long-term mental or severe long-term behavioural disturbance or disorder
- The loss of a foetus.

[ii] Red tape is considered to be arduous paperwork and processes that prolong decision timeframes.