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Information Technology and Management Consulting

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Transforming Actuarial Performance at a Group Carrier

EXECUTIVE SUMMARY

A group insurance carrier sought to use its data assets to improve and accelerate its actuarial functions. In partnership with the company's executive leaders, Princeton Consultants proposed, designed and implemented an enterprise data warehouse. As a result, the carrier's actuaries will greatly reduce the approximately 40% of time they had been spending on preparing, processing, and storing data, and they can now perform state-of-the-art analytics and reporting that contribute to increased competitive advantage and long-term profitability.

THE CHALLENGE

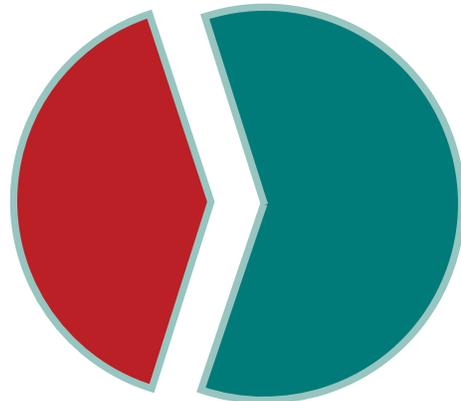
At a group insurer with millions of insured lives, the actuarial department is responsible for long-term profitability. Its critical responsibilities include many types of advanced and predictive analytics, annual studies on cases, and financial reports for company leadership. In assessing performance, department executives had become aware of two key deficiencies:

1. Actuaries were spending significant amounts of time performing tasks unrelated to their core mission of making the company profitable.
2. Because of deficiencies in data, actuaries were not able to perform certain state-of-the-art analyses that their competitors routinely use.

In light of similar challenges across the main business functions, the insurance company's CEO asked Princeton Consultants to assess the needs of every department, including the actuarial function, to recommend a unified business process reengineering (BPR) and business intelligence (BI) strategy, and to develop a roadmap and implementation plan.

Helping Actuaries Improve Their Productivity

PROBLEM: Actuaries had to spend significant time preparing data to do their jobs.



40% Clean, correct, adjust, derive data; maintain internal databases; create ad-hoc reports.

60% Activities requiring actuarial training

AN ACTUARIAL PROCESS BOGGED DOWN BY CHALLENGES



1 Download key metrics from the operational mainframe.

Challenges:

- Uses resources on operational system to meet non-operational goals. This can adversely affect the real-time performance of the mainframe.
- Downloaded data is not in user-friendly format.



2 Clean the downloaded data.

Challenge:

- Since the operational database has few data-quality validations, there are many errors in the downloaded metrics that have to be manually corrected.

3 Correct or adjust the data for various business scenarios not handled by the operational system.

Challenge:

- Since the source system is several decades old and quite inflexible, it has not adequately evolved over time as new businesses were acquired or new processes were established.



4 Store corrected data and derived metrics in siloed databases owned by the department.

Challenges:

- Actuarial has to develop expertise to maintain databases without IT support.
- These databases are not available to other departments.



5 Create reports for financial management, accounting, year-end study, etc.

Challenges:

- Reporting using the operational mainframe (and siloed databases) is inefficient and error-prone.
- The resulting reports are not user-friendly or suitable for customer consumption.

6 Respond to ad-hoc requests for data (especially derived metrics) from other departments.

Challenge:

- Other departments, such as Underwriting, Claims, or Compliance, often require access to the derived metrics stored in Actuarial internal databases. Actuarial has to spend significant time responding to these requests.



7 Perform analytics.

Challenge:

- The structure and quality of the existing data make advanced analytics difficult or even impossible (for certain types of time series analysis).

ANALYSIS

A company typically derives its greatest benefit from improving its frequent operations. As *BPR* specialists brought on board to effect change, Princeton Consultants focused on recurring business processes and associated systems.

As a successful company scales with growth over the years, delivery often takes top priority while systems and processes lag. This tendency is familiar to many operational executives in Insurance and in diversified industries. Our insurance client had a monthly process like the one below, consuming most of each month. At each step, process and technology had lagged and fallen out of alignment with need.

From another perspective, the misalignment is even greater: While these steps and supporting tools would be suboptimal for anyone doing the work, for a high-dollar resource like an actuary, they cost our client real money.

Specifically, steps #1, #2, #4, and #6 are removed from the core mission of the department, and do not utilize the significant professional training and expertise that most actuaries have. Yet, as shown in the figure to the right, actuaries were spending a significant amount of time on these tasks. This left fewer resources devoted to analytics and reporting. Princeton Consultants identified this Actuarial monthly process as one of the key focus areas of the BPR strategy and implementation plan.

After the process analysis, the team drilled down to what became the major issue: the data. Actuaries cannot assess risk, price policies, and project profits without clean, accurate data, and the data available to the department, while copious, was deficient in a number of ways.



DATA DEFICIENCIES

1. The data quality was low because, in the first place, the source system performed few validations. Second, the actuaries themselves were able to perform only a limited number of validations when they downloaded and cleaned the data, since each validation was a manual, painstaking process. Third, even if they detected incorrect or missing data, they often did not have enough information to correct it as they are not the owners/producers of much of the source data.
2. Any cleaned or corrected data (steps #2 and #3 above) went into the siloed departmental databases only; the corrections were not reflected in the source system. Thus incorrect source data was often used by other departments, or even different other actuaries who might not be aware of the corrections. Plus, there was no feedback mechanism to the upstream members of other departments who produced and owned the incorrect source data.
3. The data was not user-friendly. This has several aspects. First, the source mainframe was old and disk space at a premium, so to save space many data points were stored using esoteric codes and abbreviations, the meanings of which were known only to a few people in the entire company. Second, because the existing data was operational in nature, it was often structured and organized around granular business processes (such as processing a claim) rather than broader business categories. This made the data difficult to interpret and use for people not familiar with those specific business processes. Third, the operational database was not optimized for ad-hoc queries, complex queries, or report writing (in terms of table structure, summary information, partitions, indices, data retention, etc.).
4. Some key temporal data was not captured in the current steps. Specifically, actuarial analytics require tracking and performing time-series analysis of experience metrics in multiple temporal dimensions. This allows actuaries to refine and fine-tune their forecasting models with greater accuracy. The existing business process did not capture enough data to allow them to do this.

SOLUTION

Having thoroughly assessed the needs of the actuarial and other departments, Princeton recommended an enterprise data warehouse (EDW) with a BI layer, and associated business process changes. Describing all the aspects of an EDW is beyond the scope of this case study. However, some of the pertinent features that directly addressed our client's business problem are:

1. The EDW is a central data repository for all departments, for both data producers and data consumers. It is a single version of the truth, that all users have access to (subject to proper security procedures).
2. The EDW is sourced from multiple operational systems and siloed databases. The extract, transform, and load (ETL) process that updates the EDW on a daily basis runs before business hours. Thus, non-operational users (such as the actuaries) will no longer put any extra strain or degrade the performance of the operational mainframe.
3. In the ETL process, the data is cleaned using a data quality (DQ) layer. The DQ layer also reports incorrect data to the business systems owners, so that they may fix their processes and source data.
4. The EDW data is standardized and made user-friendly. For example, all codes are decoded to text descriptions. Also, the data is organized in broad, easy-to-understand business categories, such as claims, enrollment, sales, etc. The data is divorced from specific business processes as much as possible (unless the data point is about the process itself, e.g., enrollment processing).
5. Actuarial adjustments (step #3 above) and calculations for derived metrics are built into the ETL process. Apart from saving hundreds of actuary hours each month, this makes the corrected/adjusted/derived data quickly available to the entire company. These adjustments are parameterized in a way that allows them to be quickly updated as Actuarial models evolve.
6. The EDW is fully optimized for report writing, advanced analytics, ad-hoc queries, etc. This involves both data model features (such as summary tables and views), as well as technical features (such as indices, partitions, etc.).
7. The EDW versions and tracks changes to data over time. This allows analysis not currently possible using the operational system.
8. The EDW captures temporal data in multiple dimensions to meet Actuarial analytics and modeling requirements.

RESULT

The monthly actuarial process outlined at the start of this case study has been transformed in a revolutionary manner. Actuaries are able to focus on their core mission of making the company increasingly profitable, and they have the data needed to do it. Specifically, they:

DO MORE:

Trend analysis

Temporal analysis in two time dimensions

Use conformed dimensions (EDW feature) to make connections between data coming from disparate sources and departments

Utilize EDW/BI layer to create impactful customer-facing reports, as well as more accurate internal reports



DO LESS:

Data cleaning

Manual corrections and adjustments

Manual calculations

Create and maintain internal Access or Excel databases

Respond to requests for "correct" metrics – with the EDW, every department will have access to Actuarial models and data



CONCLUSION

Following a thorough requirements and gap analysis, process engineering, and implementation of an EDW/BI system, this carrier has transformed its actuarial process, and is now on a path to increased usage of advanced data analytics.

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ABOUT PRINCETON CONSULTANTS

Princeton Consultants is an information technology and management consulting firm with offices in Princeton, NJ and New York, NY.

Founded in 1981, the firm has delivered more than 1,500 projects for many of the world's largest, most successful and innovative companies.



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