MULTI-LINE INSURANCE EXPOSURE DATA SCHEMA

Global Exposure Accumulation and Clash (GEAC) Project

Consultation Document v0.1

Centre for
Risk Studies

UNIVERSITY OF
CAMBRIDGE
Judge Business School

Multi-Line Insurance Exposure Data Schema

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1   A Standardised Multi-Line Insurance Exposure Data Schema

Cambridge Centre for Risk Studies (CCRS) has been encouraged by its supporters in the insurance industry to coordinate the development of a data schema to capture insured exposure in all the main lines of insurance business. This follows the success of Cambridge Centre for Risk Studies' coordination of an exposure data schema for cyber insurance in 2015.[1] This multi-line initiative will broadly follow the same process and approach.

1.1   Aims and Objectives

We propose to develop an open source multi-line data schema to capture the most significant lines of insurance across all geographical markets. The data standard will be independent of the platform on which it is implemented.

The proposed schema will provide a standard minimum set of exposure data fields which will enable insurance and reinsurance industry participants to:

a) Provide a more comprehensive and standardised framework for monitoring and reporting exposure enterprise-wide and as a system of record, for risk managers, brokers, consultants, and analysts;

b) Improve interchanges of data between market players to improve risk transfer to reinsurers and other risk partners, reporting to regulators, and information exchanged for risk co-share, delegated authority, and bordereau activities;

c) Apply accumulation risk model scenarios for classes of business that currently have less well-developed models available for them;

d) Support clash model analysis for scenarios that impact multiple lines of insurance;

e) Enable a new generation of models and risk analytics and expand the scope of potential risk management applications.

The schema will aid in the development of a more unified industry by increasing the capability for dialogue and cross communication.

A. Please Comment: Which of these aims is most important to your organisation? Are there other aims that should be addressed?

1.2   Project Structure

We are planning a two-year project, which will develop the schema in a series of phases. Interim reports will report the project's progress and solicit iterations of feedback. The project can be broadly described as a series of steps, listed below.

1. **Market Practice Review.** The first step in the schema's development is a review of market practices, schemas and data systems currently in use, and examples of company internal data management activities, and an estimation of the amount of exposure currently managed in different lines of the insurance industry worldwide. This review is reported in this document, v0.1

2. **Prioritising Lines of Business.** Due to the scope of the schema, the development will be carried out in three phases. We propose a suggested prioritisation of which of the different lines of exposure lines

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[1]   Cyber Insurance Exposure Data Schema was ultimately published in January 2016, see CCRS (2016).

should be completed within the first, second, and third phase. This comes from initial consultations with industry participants. In this document we are requesting feedback to confirm or amend this prioritisation of lines of businesses for schema development.

3. **Principles for Developing the Schema.** We propose a series of principles to guide the development of the schema design. We are requesting feedback on these principles in this document.

4. **Schema Development.** Once we have feedback from this version 0.1 consultation document, we will begin to develop the schema. For each line of business, there will be three iterations of a proposed schema, with a round of industry consultations for each one. A separate report will be generated for each stage, outlined below:

    i.   Version 0.5 Key Components: A proposed structure for the schema for the specific line of business, defining the main categories of data.

    ii. Version 0.9 Structure: A proposal for the minimum data requirement specification, for example the listing of data fields.

    iii. Version 1.0 Complete Schema: A first complete minimum data standard for that line of business, including listings of field values and reference tables.

The schemas will be published for each line of business as they become complete. A version 0.5, 0.9 and 1.0 report will be generated for each of the lines in the three phases.

2   How Will This Data Schema Improve Insurance Business Practice?

The schema will be designed for reporting and monitoring insured exposure. The main purpose of the design of the schema is to improve the management of insurance exposure accumulation risk.

The proposed schema will enable the following use cases:

2.1   Enabling exposure analytics in more lines of business

The schema will enable loss modelling for more lines of business. In this project it is not envisioned to develop new risk models for each of the lines of insurance business that the schema covers, but the existence of a standardised schema will make it possible for insurers to create and apply their own internal models and for third parties to develop new models. We hope to facilitate an expansion of risk modelling beyond the lines of traditional property catastrophe models.

2.2   Single policyholder aggregation risk

The schema will provide a means to track and aggregate all the areas of exposure and different lines of cover being provided to a single policy holder, for example a major corporate insured. Standardising the way of tracking corporate insureds is intended to be able to consolidate the exposures of a single company that could have policies within an insurance or reinsurance portfolio that have originated through different channels, policies, or treaty participation.

2.3   High value single location aggregation risk

Individual locations where there are concentrations of insurance assets and liabilities across multiple lines of coverage will become easier to identify and quantify with the proposed schema. Examples such as the loss of the World Trade Centre in the 9/11 destruction of 2001 demonstrated that losses were triggered across many lines of business, some of them were surprising, and several were record loss pay outs for their particular line of business. Locations with concentrations of multiple lines of insurance exposure could include major airports and rail terminus complexes, prestige commercial property developments, retail malls, major industrial facilities, infrastructure and supply hubs, and many others. Identifying the locations where many insurance lines have concentrations of risk is an objective for tracking multiline exposure in the data schema.

2.4   Multi-line clash in complex loss events

The schema will provide a clear understanding of the multiple lines of business impacted by complex risk events. As a result of commercial interconnectivity and liability relationships between counterparties, non-intuitive losses occur, but have historically been difficult to express across multiple independent schemas. Through the availability of one standardised multiple line data schema, connectivity and consequences from clash events can be identified.

B. Please comment on the proposed use cases: Are these the appropriate use cases? Which of them are most important to your organisation? Are there other use cases that should be incorporated?

3   Review of Current Market Practice

The preparation work for this project has included a review of data schemas and standards currently in use in the insurance industry. Sixteen schemas and data standards have been reviewed and are described below, and in most cases we have been able to obtain a full copy of the structure of the schema for review. We gratefully acknowledge the assistance provided by each of the organisations that provided their data schemas for inclusion in the market practice review.

The review shows that there are many different data schemas and standards in operation across the insurance industry. Some classes of insurance exposure are much better described and are commonly captured in greater detail than others. Property Catastrophe is one of the most developed area of exposure capture, with several vendors of analytics specifying exposure data structures that enable the models, and that can capture highly granular detail about the insured assets. Other lines of business tend to be documented in various types of Policy Administration Systems, with an emphasis on tracking accounts, binding authorities, managing claims, and maintaining contractual information about the insurance coverage. Several schemas have been proposed by standards authorities for insurance exposure capture, with a view to standardising the exchange of data between market participants, or for submission to market regulators or rating agencies.

There is no single standard that is currently in use that provides a complete coverage of all of the main classes of insurance across the industry for exposure management. Most insurers that we have interviewed have assembled systems that take components from several of these offerings and then have their own integration techniques for deriving management reports across the different classes that they hold.

The schema will need to support and enable interoperability between systems, and adopt the most commonly used practices where possible.

3.1   Insurance Data Schemas Specified by Standards Authorities

ACORD

ACORD provides an industry standard for exchanging insurance information, internal and external messaging, standard transaction types, and claims management processing. It is widely used across the industry, and provides an extensive coding structure at a detailed level of insured assets. The coding structure is widely adopted in many parts of the international market.

- ACORD standards are used across insurance and related industries.
- ACORD standards are the market norm for the London and European insurance market for messaging between counterparties.
- ACORD XML schemas support Web Services Standards (AWSP, based on W3C and OASIS Specifications).

- ACORD supports UN CEFACT naming and design rules so schema features and conventions are able to be reused.
- ACORD provides an extensive capture of components of non-life insurance business.

International Organization for Standardization (ISO)

The International Organization for Standardization (ISO) publishes standards across various industries, including technology, food safety, agriculture and healthcare. The standards are recognised across the public and private sector, and provide guidelines for data standards in the insurance industry.

- ISO publishes standards for schemas, specific to resource holdings.

- ISO does not provide insurance-specific documentation standards, but has industry-specific standards (e.g. Automotive) and data standards related to characteristics and attributes of insured assets (e.g. Geographic Information).

- ISO recognises that the use of technology is changing data standards and provides guidelines to accommodate changing requirements over time.

British Standards Institution (BSI)

The British Standards Institution (BSI) is the national standards body for the United Kingdom. The institution offers technical standards, certifications, and standard related services to businesses. The institution does not currently have an insurance data schema, but has conducted research relating to the insurance industry's need for standardisation. This is highlighted in their 2014 study, _Opportunities for Standards in Insurance_, which has been a helpful resource when identifying current available standards and existing gaps within the insurance industry. Conclusions from the study include:

- Historically there has been high variation in insurance coverages taxonomy.
- BSI suggests that voluntary standards aid in increasing transparency and encouraging competition.
- BSI provides a standard list of types of insurance policies (ABI, 2013).

A.M. Best Insurance Rating Structure

A.M. Best provides a structured process for filing returns for the rating process of insurance companies, including reporting on the exposures and lines of business written by US and international insurers. It applies an enterprise-wide assessment, including the quantification of risk in five primary categories, considering the impact of risk correlations, and facilitates the routine reporting of risk assessments to senior management.

Lloyd's Risk Codes and Target Operating Model

Lloyd's Risk Codes include around 250 codes for standardising lines of business in the London insurance market and for Lloyd's regulatory reporting by their managing agents. Lloyd's Target Operating Model (TOM) is being developed to provide electronic data capture for insurance communication and contractual discussion. It is still in its development stages, but is anticipated to reduce some of the existing communication difficulties and inefficiencies within the London Market. TOM will provide a centralised administration, and is focused on data standards and providing consistency in data exchange.

- TOM will eliminate redundancy and human error associated with manual entry.
- TOM will eliminate duplication across the industry.
- TOM allows one touch data capture by converting information from various sources into a universally acceptable platform.
- TOM has collaborated with ACORD and has integrated their standards into the messaging platform.

UNECE: XML Naming and Design Rules

The United Nations Economic Commission for Europe (UNECE) has published documentation for XML naming and design rules applicable across various industries. Although not specific to insurance, the documentation is broadly used for naming and design across the public and private sector, and includes structures for data standardisation.

- UNECE rules are developed to enhance information interoperability across independent industries.
- Standard reflects rules for naming and modelling, modularity, namespace, and versioning.
- Example standard includes limiting acronyms, abbreviations, or word truncations.

3.2   Data Schemas in Insurance Policy Administration Systems

Xuber Xposure

Previously OpenXposure

Xuber Xposure is a software product created by Xuber to allow for better understanding and management of exposures through peril modelling. The platform provides a database of an organisation's exposure, displayed as a system of record. The software is used to collate and aggregate data sets, and provides catastrophe modelling and exposure management for the insurance industry. Xuber is recognised for its specialisation in upstream energy, but covers a variety of lines of business. ACORD data standards are used in Global XB Solutions.

Russell Group

Russell Group is a risk management software and services organisation that offers ALPS, an integrated underwriting risk framework for specialty classes, specifically enterprise, aerospace, energy, marine and non-marine. ALPS software has six areas of functionality for modelling specialty class exposure and loss simulation including the management of large and complex data sets, the capture of underlying risk data, and the modelling of portfolio losses. The framework also models the gross portfolio loss and resilience of specialty insurance portfolios from realistic disaster scenarios and other impact scenarios through Russell's ALPS Aggregate Management.

NIIT Technologies

NIIT Technologies is a broad IT organisation which offers a variety of outsourcing services to industry sectors. For the Insurance industry, NIIT offers the Advantage Suite used for policy administration, data management, data modelling, and data warehousing. Advantage is focused on specialty lines of insurance business. Navigator is a part of this suite, and is currently being used within the industry as a high level policy administration system. Navigator provides structure for data capture, storage, and access within the industry.

3.3   Property Natural Catastrophe Data Standards

Applied Insurance Research Worldwide

AIR Worldwide is a provider of property natural catastrophe modelling software, covering a wide range of perils and international geographies. AIR data standards and the database schema for their Touchstone and CATRADER software platforms is published online to increase transparent data exchange. Lines of insurance business incorporated include property, specialty, marine, energy, workers' compensation, cyber, life and health, and agriculture.

AIR Touchstone Exposure Data is based on the UNICEDE family of data formats that was originally introduced by AIR in 1993 to become an industry standard for insurance data exchange of aggregate and detailed exposure data for natural catastrophe risk modelling.

- AIR Worldwide data schema relates to attributes used for evaluating risk exposure

- The schema meets ACORD property exposure standards, with applicable features included.

- AIR provides examples of schema design, attribute allocation and descriptions used in the industry

OASIS Loss Modelling Framework

OASIS is a non-profit Loss Modelling Framework (LMF), enabling plug-and-play components of catastrophe risk models on a common open architecture platform. Oasis LMF allows organisations to run their own natural catastrophe models on a common platform and allows users to define appropriate data and attributes. OASIS defines an Exposure and Policy Data Interface that enables exposure data to be translated from different types of native format from other models in the industry. OASIS has a series of standards for modelling within the framework. Oasis LMF identifies the wide range of exposure modelling options that exist within the insurance industry.

Risk Management Solutions, Inc. (RMS)

RMS is a provider of property catastrophe risk models for the insurance industry with an exposure data model (EDM) that contains a proprietary data structure for managing insurance account information, aggregate data, facultative insurance and reinsurance portfolio information.

RMS is a primary sponsor of this Cambridge Centre for Risk Studies project to develop a multi-line exposure data schema.

RMS provides analytics for a variety of perils and geographical markets via its RiskLink product and the RMS(one) platform. Insurance lines modelled include property catastrophe, industrial and commercial lines, worker's compensation, terrorism, cyber, marine cargo, life and health, annuities, and others.

3.4   Data standards for modelling other lines of business: Casualty Liability

Arium Risk Architecture

Arium Risk Architecture provides risk modelling and decision support for insurance lines including Casualty Liability, Credit Risk Insurance, and Life & Health. Arium provides a Casualty Analytics Platform and a Risk Analysis Tool, primarily for the reinsurance industry, with insights into standardising casualty liability exposure data.

- There are very significant differences in the liability insurance structures in different jurisdictions, for example between US, UK, and European liability exposures.

- Casualty liability insurance coverage varies significantly geographically, with almost half of the exposure in the United States

- Identifying unique corporate entities is important to tracking casualty liability exposure.

- Casualty liability events cross many sectors of the economy – they are rarely constrained to a single sector, and the systemic nature of liability is a key concern of insurers in tracking and managing their exposures.

Praedicat

Praedicat provides casualty liability catastrophe analytics and tracks emerging liability risks. It enables insurers to manage a portfolio of liability exposure using their Liability Catastrophe Modelling Platform, Oortfolio™, which provides data for underwriting and aggregation risk management. Praedicat casualty liability exposure data schema insights include:

- Data standards are being established at the underwriting desk, and reflect underwriters' needs

- DUNS codes are the preferred standard for individual company tracking.

- Core attributes of companies and policy details are an essential part of liability accumulation segmentation.

Willis Re eNTAIL™

Willis Re eNTAIL™ Casualty catastrophe model provides an open-format structure for allocating casualty catastrophe events to a loss taxonomy, and maps companies' exposure with event loss tables to benchmark casualty risk to other lines of business and interfaces into capital modeling software. It is promoted as a 'bottom-up' management tool to manage accumulation risk for casualty.

3.5   Data standards for modelling other lines of business: Agricultural Risk

AgRisk

AgRisk is a modelling and analytics company with a focus on agricultural risks and perils. AgRisk provides various resources for understanding agricultural risk, including identifying what risks exist, lines of business which may be involved, and appropriate risk attributes that should be included.

Table 1: Summary of Data Schemas Reviewed

	Organisation	Primary Focus	Main Insurance Classes Covered
ACORD	**ACORD**	Data Exchange Standards	Non-Life
ISO	**International Organization for Standardization (ISO)**	Data Exchange Standards	Non-Life; Life & Health
bsi.	**British Standards Institution (BSI)**	Data Exchange Standards	Non-Life
BEST	**A.M. Best**	Rating Submissions	Life & Health; Non-Life
LLOYD'S	**Lloyd's Risk Codes**	Regulatory Submissions and Data Exchange Standards	P&C, Reinsurance
UNECE	**UNECE: XML Naming and Design Rules**	Data Exchange Standards	Non-Life; Life & Health
xuber	**Xuber Xposure**	Policy Administration System	Property
Russell	**Russell Group**	Policy Administration System	Specialty Classes
NIIT technologies	**NIIT Technologies**	Policy Administration System	Specialty Classes
AIR	**AIR Worldwide**	NatCat Modelling	Property; specialty, marine, energy, workers' comp, cyber, life and health, agriculture.
OASIS	**OASIS Loss Modelling Framework**	NatCat Modelling	Property NatCat
RMS	**RMS, Inc.**	NatCat Modelling	Property; Industrial; Marine Cargo; Workers Comp; Cyber; Terrorism; Life & Annuities
ARIUM	**Arium Risk Architecture**	Liability Risk Modelling	Casualty Liability
Praedicat	**Praedicat**	Liability Risk Modelling	Casualty Liability
Willis Re	**Willis Re eNTAIL™**	Liability Risk Modelling	Casualty Liability
AgRisk	**AgRisk**	Agriculture Risk Modelling	Agriculture

C. Please comment on the Data Schema market practice review: Are there other data schemas that play a major role in shaping insurance risk management?

3.6   Individual Company Practices

Exposure data management practices vary significantly from company to company, and appear to evolve continuously as organisations change. Data organisation methodologies today differ in source, design, and application. Businesses group the range of classes of exposure under quite different management structures, and there is wide variation in nomenclature and terminology.

Companies tend to compile and extract management reports from a variety of different systems in various departments across their business. Consolidation within the industry has led to multiple systems being

maintained within large insurance enterprises. International insurers manage large numbers of different data repositories, exposure data bases, and reporting analysis output archives.

However, many companies are now taking a strategic and enterprise-wide view of their exposure data supply chain, and creating systems and processes that will feed management views of consistent exposure reporting across their departments. Several companies now regard their exposure data as a critical business asset.

Market practitioners view current insurance data management practices as being inconsistent across different classes of exposure. Many recognise the need for greater consistency and a general level-setting for insurance exposure across the range of lines of business that make up their insurance operations.

3.7   Conclusions and recommendations from Market Practice Review

This market practice review provides an overview of current schemas available and data structures that are in common use. Our objective is to understand current gaps within the industry, and evaluate what deliverables would aid in advancing operability in the current risk environment.

General Conclusions	General Recommendations
• Although there are many schemas in operation, no single standard can be easily adopted to provide complete coverage of all of the main classes of insurance exposure across the industry. • Managers of insurance business are currently facing issues in monitoring and reporting exposure enterprise-wide, comparing lines of business, and modelling multiple lines of insurance. • Uniquely identifying an organisation's purchases of different insurance policies is an important component of tracking exposures. • Insurance products and coverages vary significantly and even similar classes of business may be labelled differently within different companies. • Lines of business continue to adapt to changing risk environments. • Standardising casualty liability exposure data is commonly identified as a high priority. • ACORD is a major player within the insurance industry, and has a series of standards which are widely used and respected. • The use of technology is changing standards and how they are being used.	• Any schema should be flexible enough to adapt to changing lines of business, and to assist companies in standardising their own data flows and benchmarking. • The schema will need to be granular enough to allow different companies to use it within a variety of different departmental structures and organisation of lines of insurance business. • Allow companies to design how different insurance lines fit their own business structure. • Expect terminology variation, and allow for translation between different users and in different geographical markets. • Ensure that any schema is backwardly compatibility (later versions do not invalidate previous versions). • Propose a standard way of uniquely identifying individual companies. • Flexibility will be enhanced if the assets that are being insured are categorised separately from the insurance coverage. • Schema should be compatible with, and able to be translated or mapped to the existing standards in use, particularly those required for regulatory and ratings filings, ACORD, and the policy administration and other exposure management systems in use.

D. Please comment: Are these observations consistent with your understanding of current market practice? Are the conclusions and recommendations consistent with your view?

4   Prioritisation of Classes of Businesses

The development of the schema will be carried out in three phases. A number of classes of insurance business will be selected in each phase and a schema developed for each of those classes, in a series of iterative consultations and refinement. In this section we ask for feedback on the prioritisation of the order of developing the data schemas for each of the classes.

The insurance industry does not have a unified agreed structure for all of the different classes and lines of insurance business. It reports and is regulated in various categories of insurance. Each multi-line insurer or reinsurer structures itself into business units or divisions to manage different parts and categories of insurance. Organisational structures tend to cluster insurance products within the underwriting skills required, the types of customers they serve, and the geographical markets being covered. There is a variety of departmental structures in different insurance companies. Terminology for what constitutes a 'class' of business or a 'line' of business is not universal.

We have tried to identify the main components of insurance business that are recognisable across different companies, even if they are organised in different clusters or departmental groupings, and may go under different names in some organisations. We have proposed groupings of 'lines' of insurance business into 24 main 'classes' of insurance.

4.1   Life and Non-Life, Commercial and Personal Lines

The primary division of insurance is into Life and Non-Life insurance industries. These are regulated in different ways. Many general international insurers and reinsurers operate in both the Life and Non-Life industries. We intend the exposure data schema to cover both Life and Non-Life insurance industries.

A second common differentiation of insurance management is between commercial lines, sold to businesses, and personal or consumer lines, sold to individuals. This division applies to Life and Non-Life.

This segmentation provides four 'quadrants' of insurance business: Life Commercial; Life Personal Lines; Non-Life Commercial; Non-Life Personal Lines.

4.2   Classes of Business

In Figure 1, and Table 2, we categorise insurance business into 24 classes using common, although not universal, categories and groupings.

Each class of business consists of several lines of business, described in Table 2. The development of the schema will entail detailed definitions of the lines of insurance business within each class, and the attributes and classification of the accounts in those lines to inventory the exposure appropriately.

4.3   Total Global Exposure by Class

To assist with the prioritisation of classes of business for schema development, we have estimated the total aggregate insured limit represented by each class, using gross written premium information,[2] and average or approximated ratios between premium and total limit. For investment products, we have taken exposure to represent the total assets under management, as the potential loss or devaluation that could occur to those assets. We estimate that the global insurance industry manages around $665 Quadrillion ($665,000 Trillion) of exposure in aggregate limit and assets at risk. The total estimated exposure in each insurance class is provided in Table 2, and illustrated by the size of each square in Figure 1.

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[2]   We gratefully acknowledge the compilation of GWP worldwide by insurance class of business provided to us by AXCO Insurance Information Services Ltd. specifically for this analysis.
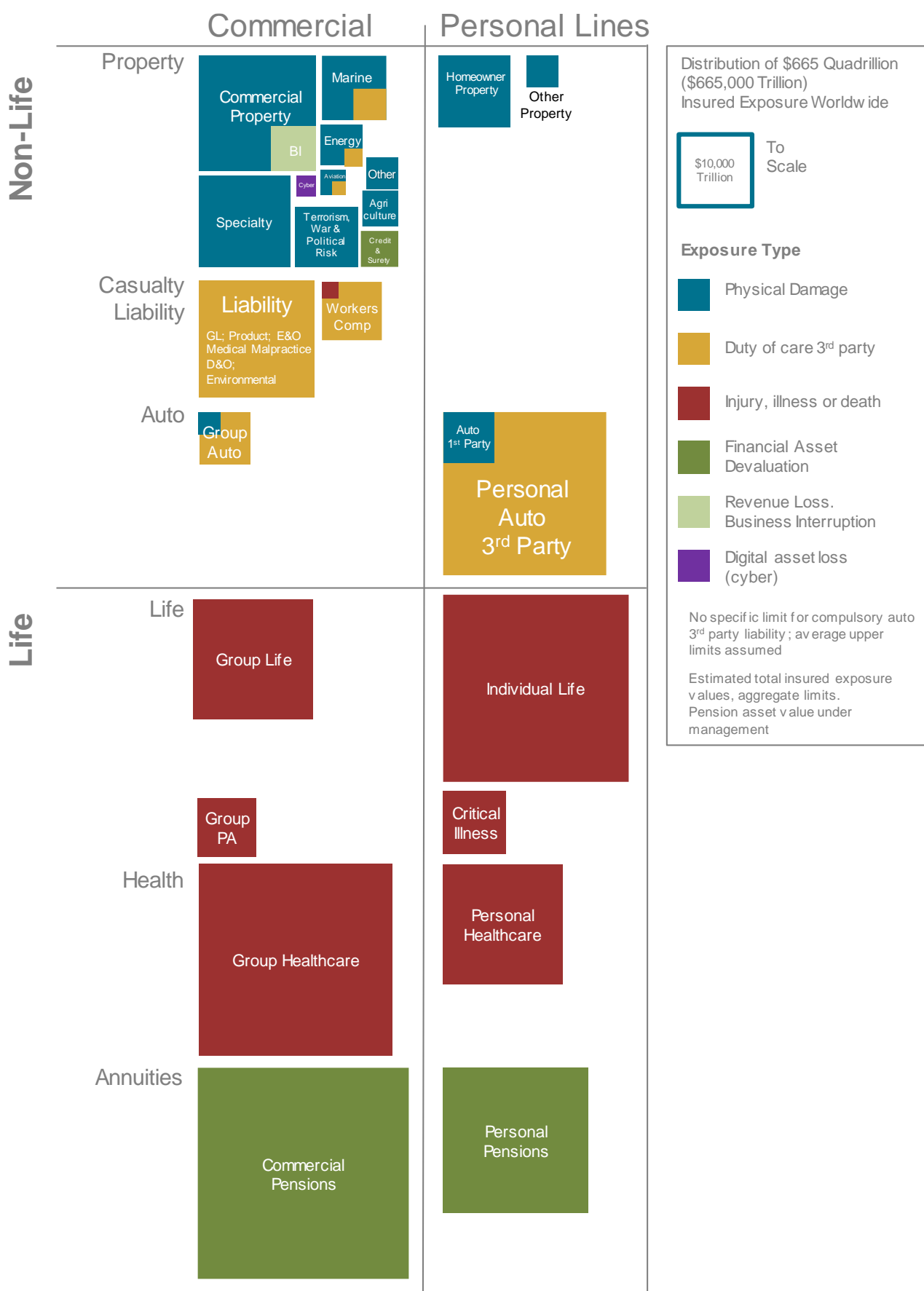

Figure 1: Classes of Business by Size of Global Exposure and Exposure Type

Table 2: Classes of Insurance Business and their Prioritisation for Data Schema Development

Industry & Group	#	Class of Business	Contains Lines of Business such as	Loss Ratio Volatility (Cat Potential)	Total Global Exposure ($000s of Trillions)	Proposed Phase
Non-Life						
Commercial Non-Life						
	1	**Commercial Property**	Commercial Buildings, Contents and Business Interruption; Industrial Facilities; Facultative; Fire Policies; Peril-Specific Property Catastrophe	High	31.7	0
	2	**Energy**	Upstream; Downstream; Onshore; Offshore; Energy Property and Liability; Generation, Transmission, Distribution; Oil, Gas, Petrochemicals; Energy and Power; Renewables; Engineering, Construction	High	1.7	1
	3	**Aviation**	Aviation Hull; Aviation Cargo; Aviation Liability and Third Party; Hangar and Airport; In-Flight; Ground Risk; Public and Passenger Liability	Moderate	0.5	1
	4	**Marine**	Marine Hull and Machinery; Marine Cargo; Marine Casualty; Marine Liability; Specie; Leisure Craft; Ocean, Inland; Port; Abandonment, Wreck and Salvage;	Moderate	8.2	1
	5	**Specialty**	Protection Extensions; Specialised Policies; Event Cancellation; Contingency Cover; Satellite;	Moderate	15.0	2
	6	**Agriculture**	Crop (multi-peril; named peril); Livestock; Aquaculture; Bloodstock; Forestry; Greenhouse	High	2.4	2
	7	**Political & Security Risk**	Political Risk; Political Violence; Terrorism; War; Kidnap & Ransom; Expropriation; Strikes, Riots & Civil Commotion; Sovereign Default; Foreign Direct Investment	High	27.0	2
	8	**Cyber**	Cyber Affirmative; Breach; Cyber Liability; E&O for IT; Cyber-Physical	Moderate	0.4	0
	9	**Credit and Surety**	Trade Credit Insurance; Business Credit; Export Credit; Surety Bond Insurance; Contract Bonds; Mortgage and Financial Guarantees; Accounts Receivable Insurance;	High	2.3	2
	10	**Commercial Auto**	Auto; Fleet; Multi Car; First & Third Party; Collision & Liability; Auto Rental	Low	5.9	3
	11	**Other Commercial**	Contractors All Risks; Engineering; Construction; Machinery; Pecuniary Loss	Low	0.9	3
Casualty Liability						
	12	**Liability**	General Liability; Product Liability; Professional Indemnity (E&O); Medical Malpractice; Directors & Officers (D&O); Environmental Liability; Employment Practices Liability	Moderate	27.7	1
	13	**Workers Comp**	Workers' Compensation	Low	3.1	0
Personal Non-Life						
	14	**Homeowner Property**	Residential buildings and contents;	Moderate	50.0	0
	15	**Personal Auto**	Motor; Personal/Individual Auto; First & Third Party	Low	58.6	3
	16	**Other Personal**	Personal and Consumer Insurance Products; Pets; Extended Warranty;	Low	3.8	3
Life & Health						
Commercial Life & Health						
	17	**Group Life**	Group Life Insurance; Key Man;	Low	28.7	2
	18	**Group Personal Accident**	Personal Accident; Critical Illness; Travel; Accidental Death & Dismemberment	Moderate	96.0	3
	19	**Group Healthcare**	Group Healthcare; Permanent Health	Moderate	92.6	2
	20	**Commercial Pensions**	Annuities; Variable Annuities;	Low	70.0	3
Personal Life & Health						
	21	**Individual Life Insurance**	Term Life; Full Life; Life Settlements;	Low	66.9	2
	22	**Critical Illness & Travel**	Personal Accident; Critical Illness; Travel; Accidental Death & Dismemberment; Income Protection; Payment Protection;	Moderate	10.7	3
	23	**Personal Healthcare**	Personal Healthcare; Hospital Insurance;	Moderate	30.9	3
	24	**Individual Annuities**	Personal Pension Plans; Annuity Products;	Low	30.0	2
				Total	664.9	

Proposed Phase

0	Already well developed in existing data schemas, not proposed to be further developed in this project
1	Phase 1
2	Phase 2
3	Phase 3

E. Please comment on the proposed prioritisation of classes of insurance business, and categorisation of the classes of insurance business.

4.4   Exposure Type

We identify six different types of exposure, indicated by colour coding in Figure 1. These represent the contractual obligations of insurers to compensate their policyholders for the different types of loss process or indemnification of their liabilities. In the case of financial guarantees, or annuity assets under management, the insurer has exposure to the potential devaluation of financial assets. The exposure type reflects different risk analytics that are needed to analyse and manage these classes of insurance business.

4.5   Loss Ratio Volatility

Table 2 also provides indicative assessments of the level of risk of each class of business, as measured by loss ratio volatility. This is an indicator of the historical annual variability of loss ratios[3] (claims that have occurred relative to the premium received), and the potential for catastrophe loss to occur in that class of business. Volatility, risk, and catastrophe potential for any class of insurance business varies significantly across geographical markets, and over time, so this measure is only indicative and intended to provide comparison between classes of business for context in the prioritisation of classes of business for schema development.

4.6   Prioritisation and Phases

In summary, this initiative proposes to develop outline data schemas for 24 classes of insurance business to capture exposure for reporting, monitoring, and analytics across all geographical markets.

There will be three phases of development, with a number of classes of insurance tackled in each phase. We plan to publish each phase as it is completed, with a provisional aim to complete all three phases within two years.

We have proposed a preliminary prioritisation of classes of business into the three phases, and are requesting feedback and comments on the prioritisation.

F. Please add any further comments on the prioritisation and phasing process of data schema development

5   Proposed Key Principles for Schema Design

The schema will provide standardised attributes for accounts and aggregations of accounts to enable exposure to be tracked consistently. Each of the 24 classes of business will be segmented into individual lines of business. The attributes proposed for standardisation will be specific to the individual line of business.

No attributes will be mandatory, but the design will indicate the most important information for capture.

Attributes of accounts that will be proposed for standardisation during the iterative design phases of the schema development, and are likely to include information such as:

- Unique identifiers for account holder in an agreed common format

- Key coverage types that apply to the line of business and important categories of terms and conditions.

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[3]   Loss Ratio Volatilities for different lines of insurance business in international markets are reported in Aon Benfield (2016).

- Jurisdiction or geographical market where the policy applies

- Policy financial terms, limits, retentions, co-shares, excess layers, sub-limits, and other value information

- Schedules of assets or insured items at risk, where appropriate with location information and other attribute information per asset

- Other critical features of information about the exposure for that line of business.

5.1   Key Principles

The following key principles are proposed to guide the development of the multi-line insurance exposure data schema.

i.   Exposure and Accumulation Focus

The primary purpose of the schema will be to report and monitor exposure and to manage accumulation, rather than other areas of decision support, such as underwriting or claims management.

G. Please comment on the most important focus of a standard insurance data schema.

ii.   As Simple as Possible

The schema should be kept as simple as practically possible.

The intent of the schema is to provide a consistent framework for benchmarking exposure across all classes of insurance business. It will go broad across classes, rather than go deep into the detail of any individual one initially. We believe that this will make it possible to complete a useable multi-line schema within the project plan of two years. Future versions of the schema will be made more complex and detailed over time.

The proposal of a standardised method for describing a class of exposure will inevitably mean that some companies will have to restructure, translate, or recode parts of their existing data. We want to make it practicable for companies to implement this schema by adapting their existing data. We propose a notional 'budget' for the total amount of effort required to transform data to meet the proposed standard, and to limit this to a practical minimum. We will be exploring what level of effort would be practical to assume for the data 'budget'. The lower the budget, the more adoption is likely, and the more successful the standardisation across the market.

An example might be that we will set each type of attribute to be characterised by preferably [five] but up to a maximum number of [ten] primary categories of attributes. Each attribute category may have a maximum of [ten] attribute values. This means that the data 'budget' might be limited to a maximum of [100] data elements to describe any attribute for version 1.0, with the potential for further elaboration and increased granularity in future versions.

H. Please comment on the objective of keeping the schema as simple as possible. How much effort do you think companies will be willing to invest in standardising their exposure data? How many data elements per exposure class do you think it would be reasonable to set as a data 'budget'?

iii.   Make the Schema Hierarchical and Extensible

We propose to make the data schema hierarchical – i.e. design it as a number of layers of attributes, each of which is capable of being further subdivided to create more detail. We propose to try to avoid lengthy lists of allowable values if possible, and instead will propose a structured hierarchy of categories and sub-categories, with a limited upper number of categories – such as ten – per layer.

We also propose to make the schema extensible. Individual companies can create their own sub-categories and add detail as they think appropriate. These will be customisable layers of detail that will be proprietary to that company.

I. **Please comment on the value of Hierarchy and Extensibility**

iv.   Separate Risk Objects from Insurance Coverage

In the schema we propose to describe the asset or item-at-risk (the 'risk object') in combination with the insurance coverages, policy, terms and conditions. The risk object will explicitly be described with one set of attributes, while the insurance coverage terms will be a second set of descriptive data values.

This separation of risk object and insurance coverage is intended to make the schema more flexible and robust against future changes, for example accommodating possible future changes in insurance product design.

This may make conforming with the data schema more effort, but is intended to provide longer term benefits.

J. Please give your view on the value of separating risk object from insurance coverage.

v.   Make the data schema compatible with ACORD and other standards

We propose to make the data schema compatible with and capable of translating into other data standards, such as regulator reporting standards, rating agency filings, and ACORD components, that are widely used across the industry. ACORD provides extensive data coding structures for elements in the insurance industry which we propose to incorporate where possible.

K. Please comment: Which other schemas are most important to align with? Is compatibility with ACORD a useful principle? Which aspects of other schemas are most useful to adopt?

6   A Data Schema for Insurance Exposure

This initiative sets out to capture the key elements of a wide range of insurance exposure to assist the insurance market. We value your feedback and guidance in shaping this initiative. Please feel free to pass this consultation document to other contacts or specialists who might be interested in providing feedback.

We will be publishing interim documents. If you would prefer not to receive further documents, please let us know. We also welcome any additional comments or suggestions to make this initiative a successful contribution to the management of insurance risk.

L. Please provide any further comments or suggestions about the proposed exposure data initiative.

7   Feedback

Thank you for taking part in the version 0.1 consultation for the development of a multi-line insurance data schema.

We will credit the individuals and organisations who have assisted in the development of the schema in the final publication. If you are comfortable with being credited, please provide your name, job title and organisation, and list any colleagues who assisted and who should be credited.

M. Please list the names, job titles, and organisation of people who helped with responses to this consultation.

Please email your completed consultation document to:

Kayla Strong
Research Assistant
Centre for Risk Studies at University of Cambridge.

Email: k.strong@jbs.cam.ac.uk

8   Acknowledgements

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