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The Association of Accountants and Financial Professionals in Business

美国管理会计师协会

数字化转型简明报告

第四次工业革命中合规与商业报告的数字化转型

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IMA®（美国管理会计师协会）是致力于管理会计行业发展的全球性专业协会。

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前言

作为一家全球性专业组织，IMA®（美国管理会计师协会）是非财务绩效指标、数字技术和“数据”（治理、分析与交付）领域的创新者和先行者。同时，还是可扩展商业报告语言（XBRL）标准和美国反虚假财务报告委员会下属发起人委员会（COSO）的创始成员，以及国际会计师联合会（IFAC）和国际综合报告理事会（IIRC）成员，对重大事项享有投票权。作为一家大型电信公司前首席财务官、IMA 现任首席执行官，我大力支持报告提出的行动倡议和紧迫要求，即使用开放数据标准、分类标准、数据交付技术和指南，提供关联程度更高、碎片化程度更低的报告。这些技术通过摒弃低效和不一致的格式来使企业报告现代化，使最具信息量的数据更高效地从源头传递到使用者。更具操作性、相关性和可靠性的数据，无疑是促进个人、组织、资本市场乃至整个社会恪守道德规范的关键。•

Jeffrey C. Thomson
CMA，CSCA，CAE
IMA 总裁兼首席执行官

前言

本篇报告呼吁进行数据革命！

气候变化正在改变公民、消费者、投资者、监管人士及其他利益相关者所期望的企业报告方式，财务报告已经无法满足需求。如今，非财务信息已被视为评估价值形成、使利益相关者获得更广泛信息的必备要素。另外，以数字化为特征的第四次工业革命正在持续改变全球市场。这些颠覆性因素相互影响，将极大地改变适应21 世纪价值范式要求的企业报告方式。

非财务数据的计量方法和标准不一而足，有些方法是一致的，有些方法较为零散，还有些方法是相互矛盾的。为解决一致性问题，业内做了大量工作，如作为企业报告对话（Corporate Reporting Dialogue）一部分的促进一致性项目（Better Alignment Project）。在国际综合报告理事会（IIRC）的支持下，财务报告的一致性工作取得重大进展。

与此同时，还需辅以 21 世纪的技术来充分提升报告的效率、清晰度和确定性，重建公众对全球市场与市场参与者的信任，应对新兴技术和气候变化带来的挑战。

例如，机器学习的发展将改变报告、监督、审计和监控系统。这会改善报告信息的可及性、清晰度、计量和质量，从而提高信息的可比性，使目前存在于孤立的报告、格式和平台中的数据得以自由流通。

报告简要介绍了可为我们提供可靠、可审计、易于获取、机器可读信息的数据革命，这些信息使用开放数据标准（如XBRL 标准）自动更新。此外，还介绍了全球分类标准注册系统和开放分类标准创新平台的创建情况。

除文中提到的几项举措以外，还有一个可能的举措是在全球范围内创建基于技术的匹配引擎，用以匹配数据分析这一重要领域的资助者和研究人员。

以上这些发展，连同渐趋一致的财务报告，将提高价值创造的计量水平，使目前难以实现的商业模式可持续性比较成为可能。这将提升非财务信息的可审计性，从而在全球范围推进综合报告的使用。

此外，报告还概述了可持续发展从业人员、会计专业人员、监管人士、投资者及其他企业报告使用者可能面临的挑战和机遇。会计和合规专业人员掌握着内部和外部报告中驱动企业发展的关键数据，他们将在第四次工业革命中发挥不可估量的作用。

这份重要报告基于解决方案，有助于探讨如何实现亟需的数据革命。•

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阿布扎比全球市场监管委员会主席

概要

每个组织都期望拥有合乎监管要求的企业合规与报告流程。

世界经济论坛宣称，随着新兴技术和空前的互联互通打破了人与数字和现实世界的界限，我们正步入“第四次工业革命”[1]。

对财会人士而言，实现数字化转型的关键在于挖掘信息技术和开放数据标准的潜力，减少企业报告和合规流程中的滞后与延时情况。数据标准（如 XBRL 标准）和创新（如区块链、云计算、自然语言处理）可以提高效率，巩固新的竞争机会，尤其是确保数据的可审计性，帮助企业为迎接第四次工业革命做好准备。

无论在世界何地，受监管实体都面临着越来越多的区域化的监管制度变化、立法、审查和问询。未能满足监管机构报告要求的后果很严重，包括罚款、负面新闻报道、在 MRIA（需立即关注事项）警告下运营，在某些情况下，企业还会被暂扣经营许可证。

监管生态系统的碎片化和差异化是企业面临的一项重大挑战，往往与重大合规风险和成本相关。过去 10 年间，世界各地的地方监管机构都要求企业提供更多信息，并强化了备案企业的合规要求。这一转变要求监管机构采用以技术和数据驱动的方法来监控企业活动，利用机器可读数据和计算机算法来执行检查、保存记录并使流程系统化。

[1]Klaus Schwab, “The Fourth Industrial Revolution: what it means, how to respond,” World Economic Forum, January 14, 2016, www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/.

美国证券交易委员会（SEC）表示，其电子化数据收集、分析及检索系统（EDGAR）中每天访问的文件和XBRL数据，多达 85% 是由机器人程序完成的。计算机信息处理等技术大大提高了受监管实体和监管机构之间传递的信息量和信息处理速度。关键数据分析速度的加快带来了巨大的规模经济和竞争优势。

据国际会计师联合会（IFAC）估计，碎片化监管每年给金融行业造成的损失高达 7,800 亿美元[2]。国际数据公司（IDC）预测，到 2025 年，全球数据量将从 33 泽字节（ZB）增加到 175 泽字节（ZB），年增幅高达 61%[3]。IBM 最近的一项研究估计，仅 2016 年美国低质量数据带来的成本就达到 3.1 万亿美元。这些惊人的数字凸显了会计和合规专业人员及相关流程转型的迫切性。

若要使会计和合规工作在新时代保持相关性，我们必须将各个数据点连接起来，使关键的财务报告、非财务报告及其他新兴形式的外部报告（EER）在总体上具备准确性、可审计性、完整性、一致性和适用性。

鉴于企业在应对众多法规要求方面所面临的压力，加之遭受巨额罚款的风险以及相关管理成本的不断上升，合规和报告给企业带来的成本和风险是毋庸置疑的。

过去 18 个月，全球领先的关联报告和合规平台供应商 Workiva 开展了一项针对英国银行业的深入研究，旨在更好地了解受监管实体在风险、成本和资源管理、效率、合规、报告等方面所面临的挑战，其研究结果普遍适用于所有行业。该项研究对所有主要的法定报告平台、报告形式和监管合规生态系统进行了评估。围绕不同行业和地域的实体企业在合规方面的共性和反复出现的问题，该项研究形成了诸多见解，凸显了优化端对端合规流程来提高整体综合效果的潜在机会。

在此，我们要传达一个明确的信息，即具有远见的会计和合规专业人员将通过实施相应的解决方案，使单调重复的工作（如标准化且不甚复杂的数据输入）自动化；而自动化又将使这些专业人员专注于增值作业活动，如支持和发展战略业务。为法定报告和合规提供更好的数据是一项共同承诺，需要一场共同协作的数据革命。

在本报告中，我们大胆断言，会计和合规专业人士掌握着内部和外部报告中驱动企业发展的关键数据，他们将在第四次工业革命中发挥不可估量的作用。•

[2] “Fragmented Financial Regulation: A $780 Billion Tax on the Global Economy,” IFAC, April 11, 2018, www.ifac.org/knowledge-gateway/contributing-global-economy/discussion/fragmented-financial-regulation-780-billion.

[3] David Reinsel, John Gantz, and John Rydning, The Digitization of the World From Edge to Core, IDC, November 2018, www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf.

引言

在降低合规成本方面，政府机构和监管部门面临的压力不断加大，既要为企业发展和资本配置创造经济条件，又要减少费用支出（这通常由财政部门拨款，其原则是少开支多办事）。

在监管报告和法定报告中，真正重要的时刻只有两个：数据创建和数据使用。与这两个时刻相关的技术流程分别被称为监管技术（RegTech）和监控技术（SupTech）。更具体地说，监管技术是指通过技术提高监管报告和合规流程的管理水平。根据这一定义，监管数据（RegData）是指某一实体按照披露要求向监管机构提交的各个数据点。监控技术是指监管机构以技术为支撑进行监管、检查结果复核和数据分析。

正如《经合组织合规成本评估指南》（*OECD's Regulatory Compliance Cost Assessment Guidance*）所指出的，合规成本由监管机构和受监管实体共同承担。[4]

监管机构承担法规发布、管理、监督和执行成本，包括：

·制定和实施许可或登记制度；
·评估和批准申请；
·续期处理；
·实施检验或审核制度；
·实施对不合规行为的处罚制度。

另一方面，受监管实体承担遵守监管和信息义务的成本，该义务是指向监管机构或指定第三方提供法定信息和数据，或备有应监管审查员要求可随时检查或提交的信息。此外，许多受监管实体必须具备独特的能力，以履行满足众多监管形式和监管机构要求的义务。

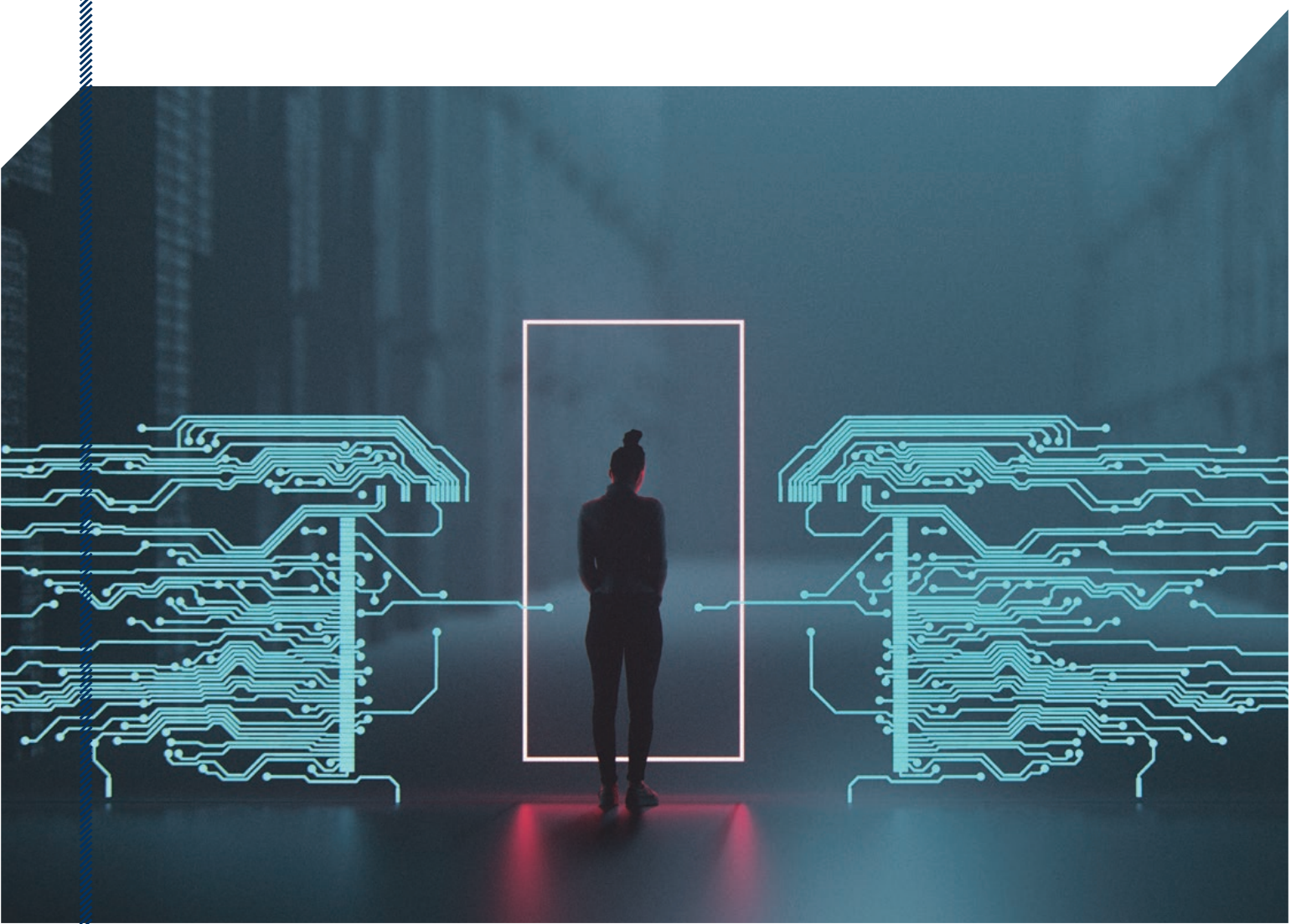
这种碎片化和差异化的监管生态系统是关系到现行合规和法定报告成本及风险的一个核心问题。

[4]OECD, OECD Regulatory Compliance Cost Assessment Guidance, 2014, www.oecd.org/gov/regulatory-policy/compliance-costs.htm.

碎片化和差异化带来的挑战

本报告的目的不在于详尽探讨各类碎片化和差异性问题及解决方案，而是明确关键问题，意在促进整个特定监管生态系统内的利益相关者——监管机构、标准制定者、受监管实体、报告编制者、多边组织、会计机构等——的对话，以便共同协作，确立最佳实践、价值提升目标以及塑造未来法定报告和合规生态系统的路径。

Workiva 近期开展的深入研究，旨在了解受监管实体所面临的主要挑战，并对其需满足的合规、报告和监控要求有全面的认识。研究揭示了受监管实体在满足报告和披露要求时所面临的真正挑战。



研究概述

Workiva 针对一个合规微系统（即英国银行业）开展了全面深入的研究。该研究涉及在英国银行业合规框架内的信息汇编、记录和评估所有主要监管数据（RegData）提交平台和报告形式，强调了英国银行在满足监管合规方面的各种因素的细微差别及各利益相关者之间的相互影响。

英国银行通过 14 个提交平台向至少 10 家监管机构提交报告，信息分布在 300 多个表单中，按不同的提交周期和频率，使用至少 7 种数据格式和超过 6 种提交模式（见图 1）。这揭示了监管和合规框架的复杂程度及其所包含的变量。基于这样的结果，就不难理解为何业界会积极转向统一和简化的合规生态系统了。

在监管数据生态系统中法定报告存在的主要碎片化问题概述如下，这也是第四次工业革命中会计和合规专业人员面临的主要挑战。

监管数据生态系统碎片化

监管数据生态系统的碎片化表现在不同的层次和变量上，包括数据格式、提交模式、某些通用元素的数据定义、业务规则、访问控制，以及针对不同报告形式和监管机构的相似报告元素的验证。我们将生态系统的碎片化划分为以下六个方面：

图1：数字解读英国银行业合规框架

10+	监管机构
14+	监管数据提交平台
300+	表单和披露文件
7+	报告形式和披露数据格式
6+	提交模式

1. 监管数据流程

众所周知，一个系统的数据输出意味着另一个系统的数据输入。跨不同系统的数据输入、数据吞吐量和数据输出之间的流程和接口并不一致，通常需要人工干预，以确保按照要求的格式对一个系统的数据输出进行重新处理，然后再验证其是否可提交给下一个系统（见图 2）。这还进一步关联到多个输出报告，因此需确保这些报告有单一数据源。例如，通过受监管实体企业资源规划（ERP）软件收集的数据需要汇编和重新打包，以满足监管机构对提交信息的“表单”和“数据格式”要求。

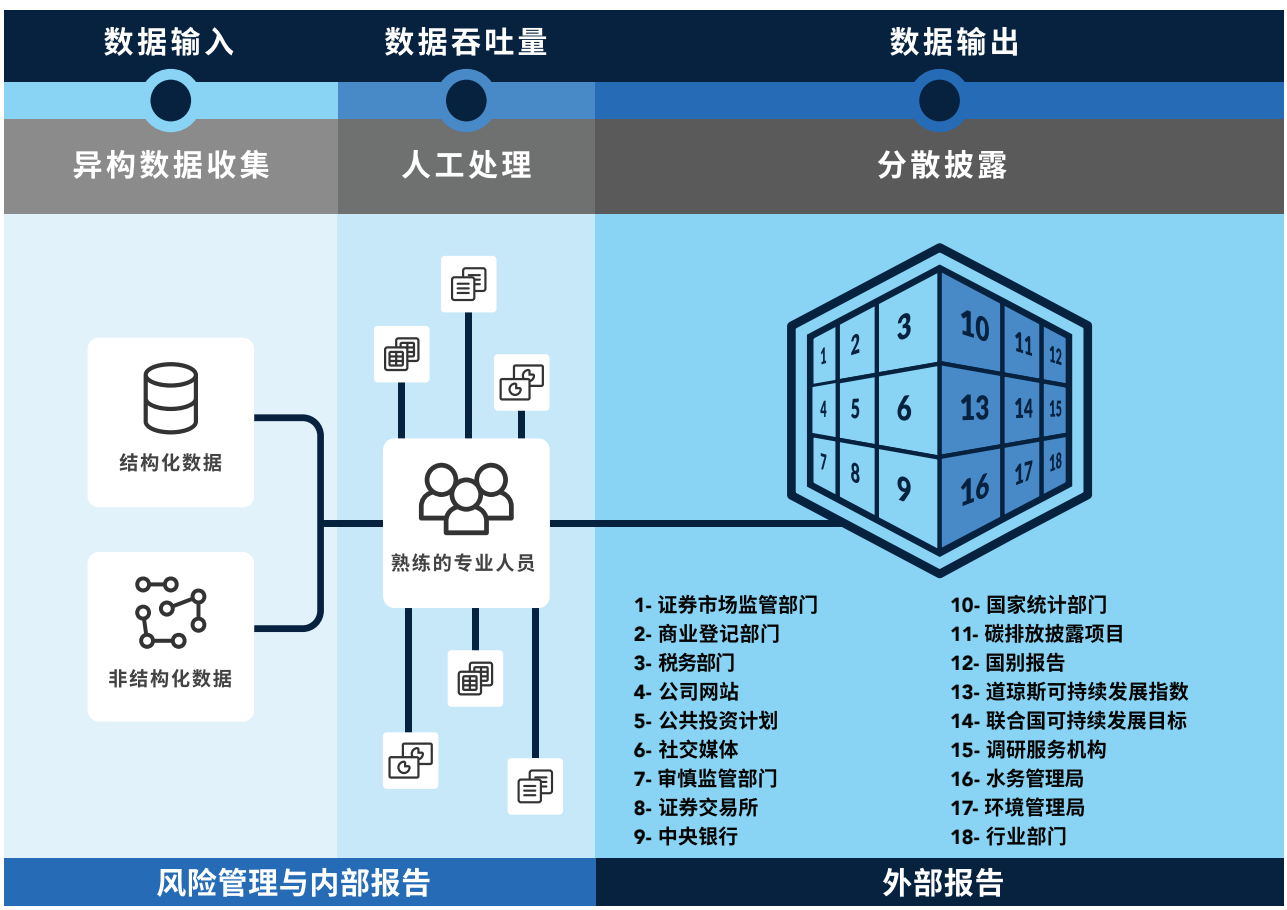
这些内部接口和外部接口之间能否实现无缝集成，依赖于规范的数据生成、验证和共享标准。

2. 数据类型

这是最常见的碎片化领域。ERP 系统内的数据是一种类型，通常需要转换成另一种类型后再传输到另一个系统。不同的监管机构要求以各自特定的格式或数据类型提供相同的信息，而奇怪的是，某些监管机构还会要求以不同的报告形式和数据格式提供相同的信息。按要求的格式组合、分解和重新打包数据，可能会导致合规问题和无意识的信息申报错误。

采用通用规范化标准

图2：碎片化的监管报告与合规生态系统



创建机器可读数据，并在合规生态系统中的所有利益相关者间进行互换，将在监管数据流程一致性方面迈出很大一步。

3. 标准和支持性文件

监管机构对相似的监管数据元素采用独特的标准、数据定义和业务验证规则。监管机构之间的标准缺乏一致性，给受监管实体和监管机构都带来更高的时间与资源成本。同时，还削弱了向众多监管机构所发送信息的可审计性，增加了因主观性增加、解释差异、错误信息以及无意的不完全合规或不合规行为产生的风险。

解决以上这些问题，需要监管机构、政府、受监管实体、会计组织、软件供应商、咨询公司、数据聚合商以及会计和合规专业人员等多方利益相关者共同协作，以坚实的治理框架为基础，建立全球性、统一、协调的数据处理与信息交换原则和规则。

4. 技术标准

不同监管机构的访问控制、验证规则和数据格式规范不尽相同，这些差异增加了合规生态系统的复杂性。

技术标准的标准化和协调化将能使数据集在利益相关者之间顺畅流动，并进一步保证数据的准确性和可靠性。

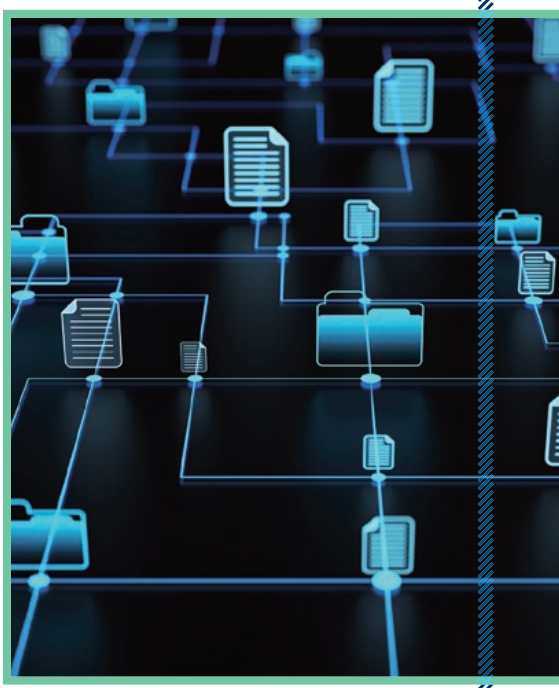
5. 提交模式

对于不同的信息形式和类型，监管信息的提交模式也有所不同。这就给以下两方面都造成了障碍：创建标准化的“最后一步”——报告验证规则、实现内部和外部系统的无缝集成。

通过统一的平台或数据仓库，受监管实体可以提交信息，监管机构、投资者及其他利益相关者随后提取信息，从而使监管数据流程更为稳健可靠。

6. 数据定义

在向多个监管机构报告相同信息时，数据定义碎片化情况更为普遍。这一现象产生的原因是沟通不清晰，以及多个监管机构之间缺乏一套统一的标准和定义。我们经常看到不同监管机构对各种数据元素定义的诠释存在差异，这自然会增加错误陈述和错误传达的风险，也会相应增加受监管实体的合规成本，因为其必须保有相同数据项的多重形式（每次向不同的监管机构提交时都必须进行验证）。



协调一致的标准和数据定义，以及向单一数据仓库提交信息，将减少数据定义碎片化带来的问题。

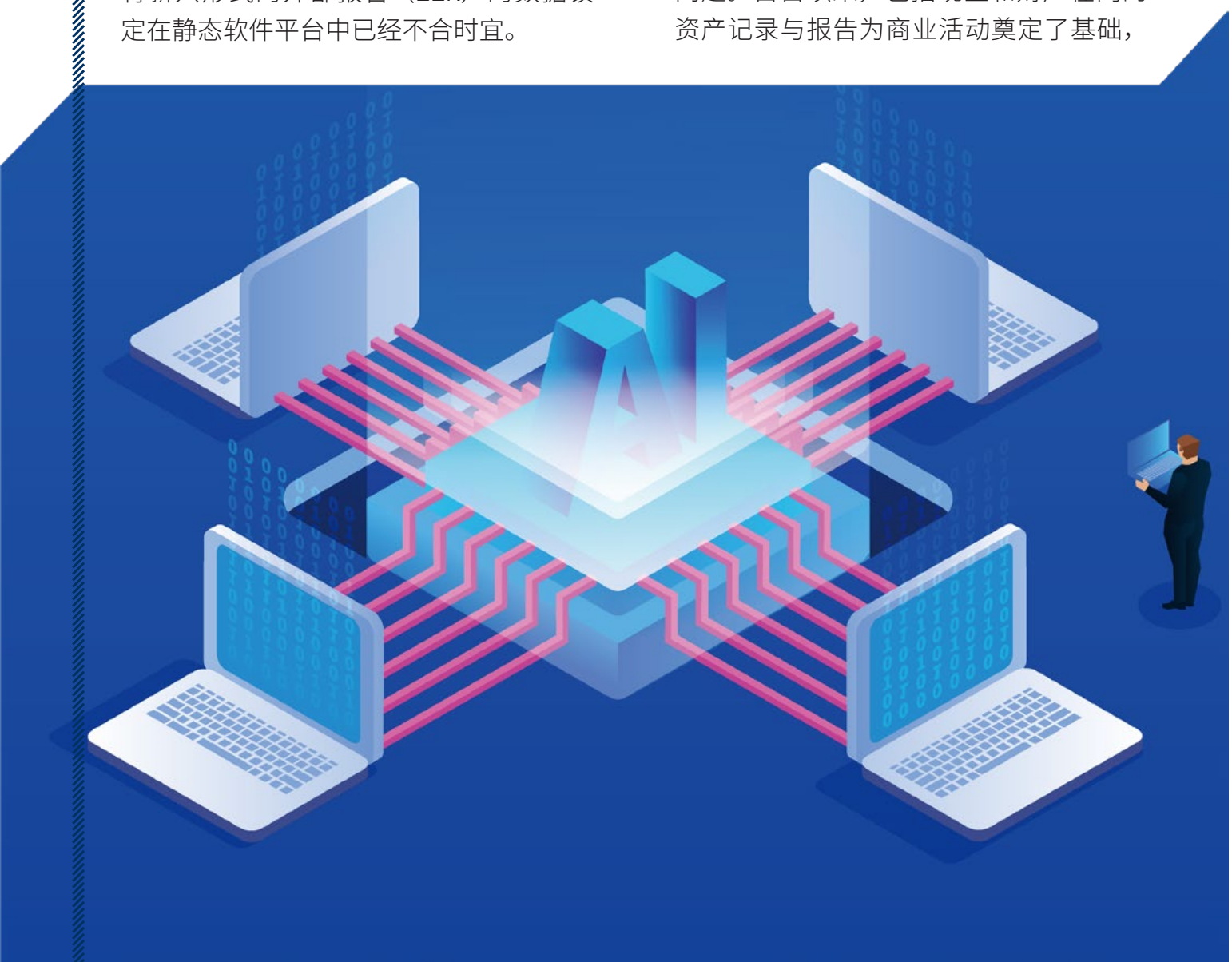
上述种种碎片化问题增加了合规对机器可读数据系统的依赖。高效率的合规需要数字化转型，并采用监管技术和监控技术。

监管数据革命的必要性

在本报告中，第四次工业革命的核心是激发下一轮监管技术和监控技术创新（即机器学习作为实现真正人工智能的途径）。人工智能将显著改进实体的报告流程，并革新监管监控系统，提高覆盖面和质量。要做到这一点，我们需要大量可审计的数据。目前，数据常常与特定的应用紧密相关。将新兴形式的外部报告（EER）的数据锁定在静态软件平台中已经不合时宜。

欧盟委员会金融稳定、金融服务和资本市场联盟总理事会（DG FISMA）近期的一项研究表明，碎片化的监管要求是产生合规成本的主要原因（见图 3）。

报告要求和框架过多、自动化程度不足等，是导致数据源和格式碎片化的关键问题。自古以来，包括现金和财产在内的资产记录与报告为商业活动奠定了基础，



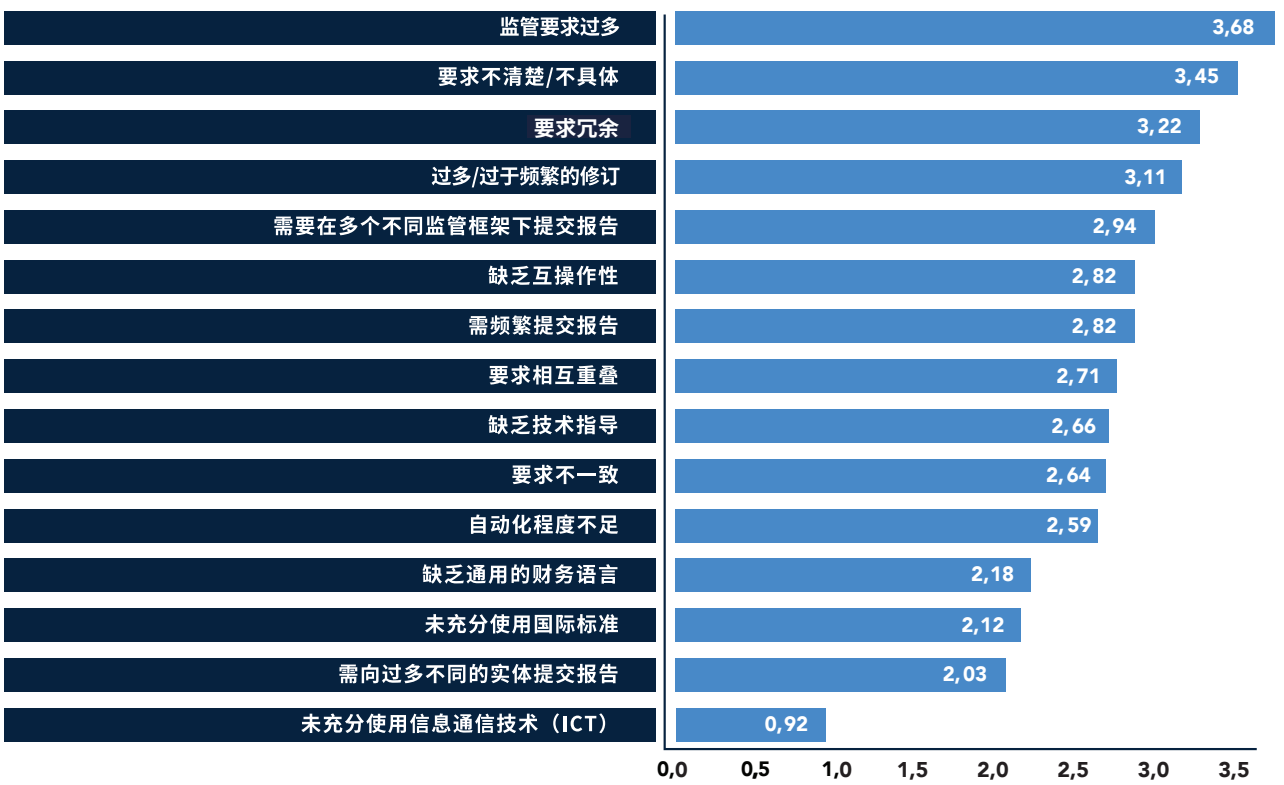
数据记录经历了粘土片、纸莎草纸、羊皮纸、纸和字节等媒介。在数百年的记录保存史中，最显著的创新是电算化，它使记录过程从纸张转变为字节。

监管报告也在发展，从交互功能有限的纸质文件和 PDF 文件转向数字出版物，后者可模拟翻页、从网络收集信息以及可供下载。多样化的报告格式，直接影响到利益相关者查找、提取和分析决策所需信息的能力。

1978 年推出的第一款电子表格软件石灰粉（VisiCalc），使会计人员从纸质账本过渡到数字账本 [5]。20 世纪 90 年代初，听说过互联网的人寥寥无几，更别说察觉到会计行业将因互联网而发生颠覆性变化。科技正在加快会计和合规行业的发展，从根本上改变我们存储、创建和提交监管数据的方式。

纸质文档、HTML 报告和 PDF 文件需要手工提取信息，将数据输入到软件中，来满足使用者的决策需求。这是一个耗时、易出错、效率低且成本高的过程。相比之下，软件工具和搜索引擎可以很容易、快速地

图3：合规成本产生的原因



[5]Christopher Mims, "40 Years Later, Lessons From the Rise and Quick Decline of the First 'Killer App'," The Wall Street Journal, July 13, 2019, www.wsj.com/articles/40-years-later-lessons-from-the-rise-and-quick-decline-of-the-first-killer-app-11562990402.

使用机器可读的监管数据，从而使监管机构、投资者或其他利益相关者腾出时间，从事具附加值的分析和解释工作。

受监管实体、政府和监管机构愈加认识到，必须摒弃过去的信息处理和报告方式。他们认为有必要放弃缺乏灵活性的纸质文档或专有数字数据格式，转而采用开放数据标准，如 XBRL 标准和 SDMX（统计数据和元数据交换）标准。正如开放数据企业中心（Center for Open Data Enterprise）在其《开放数据转型报告》（*Open Data Transition Report*）中所述，这一举措的好处包括简化监管报告要求，从而不仅可减轻行业负担，还能减少监管机构的管理和合规监督，并确保更大的透明度 。[6]

无论从信息技术还是数据治理的角度来看，这种全新类型的报告都将颠覆信息生产。为法定报告和合规提供更好的数据的共同承诺，要求我们进行一场共同协作的数据革命。

技术正在从根本上改变数据创建和存储的方式

自动化和效率

1980s	1990s	2000s	2010s	2020
桌面计算模式	ERP成为数据支柱	商业智能	大数据和云计算	自动化和现代化

[6]The Center for Open Data Enterprise, Open Data Transition Report, October 2016, reports.opendataenterprise.org/transition-report.pdf.

数据革命的目标

数据革命最基本的目标是获得可靠、可审计、可访问和机器可读的信息，这些信息与使用者息息相关、及时且可自动更新。数字化转型的成功，有赖于围绕企业报告数据和合规框架进行严格、一致的数据治理。

无论是私营部门还是公共部门的会计和合规专业人员，都需要以互联技术为核心，不断重塑其企业的报告流程和监督职能。做不到这一点的个人将无法适应未来发展，因为精通数字化转型创新的个人、组织和监管机构正颠覆整个会计和合规行业。变革背后的动力将来自三个方面：（1）监管机构；（2）会计与合规专业人士；（3）标准制定者和政策制定者。

监管机构是否准备好迎接数据革命？

世界各地的监管机构要求企业在报告中更多地使用结构化、开源（非专有）和机器可读的数据。例如，SEC 要求公众公司在年报和季报中使用 XBRL“结构化财务数据”，使投资者能够自动提取公司当前和以前年度的申报信息，以及其他公众公司的信息或有关行业平均水平的信息。

XBRL 格式是一种开源、免版税的国际数据标准，专为财务、非财务、绩效或其他新兴形式的外部报告（EER）和合规信息的数字报告而设计。XBRL 格式为法定报告中每项披露信息提供了唯一的、机器可读的标签。

日本金融厅（JFSA）是按照监管要求使用 XBRL 的另一个例子。JFSA 制定了一项宏大的计划，将监控技术用于提高其监管水平和效率 。[7] 该机构希望通过创新型数字化举措来改进信息的收集、积累和分析，减少重复性工作。

例如，目前日本银行（Bank of Japan）与 JFSA 收集的信息存在重叠。一个安全、标准化的数据共享系统将提高所有利益相关者群体的效率，那么，JFSA 打算怎么做呢？

为实现预期的数字化转型，JFSA 拟在受监管实体与监管机构之间收集和共享某些详细数据，以更好地使用精细的结构化 XBRL 数据。其目标是推动监管采用更为数据驱动的方式，从而对日本经济产生积极影响。

此外，JFSA 计划引入机器人流程自动化（RPA），以取代审查员手动执行的一系列繁重的数据分类、汇总和分析工作。RPA 可能是全球监管机构为管理精细的结构化数据收集而提出的最具创新性和挑战性的建议，这一宏大计划旨在实现高效、全面且深入的金融监管监测。

准备好了吗：监管机构

第四次工业革命所带来的诸多变革，要求监管机构迅速发现风险，确定新的市场趋势，并了解新的金融产品和不断变化的市场状况在如何影响境内外的投资者与经济。因此，在原系统上进行的微调已无济于事，需要进行一场数据革命，主动提升监管分析和预测能力。

[7] Japan Financial Services Agency, Status of digitalization efforts in financial monitoring, June 2019, www.fsa.go.jp/en/news/2019/20190703_joubun/01.pdf.

其他国家的证券监管机构、证券交易所、商业登记部门和税务部门已经要求公司采用 XBRL 格式进行申报。这些国家包括澳大利亚、巴西、加拿大、中国、丹麦、芬兰、德国、印度、以色列、日本、荷兰、新加坡、韩国、西班牙和英国。此外，欧洲证券及市场管理局（ESMA）规定将 Inline XBRL™ 作为欧盟单一电子格式（ESEF）的分类标准。这一新规适用于截至 2020 年 1 月 1 日或之后的年报，影响了 5000 多家欧盟证券发行人。

会计和合规专业人员是否准备好迎接数据革命?

对会计和合规专业人员来说，以监管数据为中心的报告方法无疑会更加强调数据管理和数据治理。

监管报告不再是一项孤立的活动，合规和报告环境的变化引发了对整体的、关联的合规监控和报告的需求。监管数据生命周期的具体实现过程因受监管实体的不同而呈现出明显差别，取决于数据性质、系统差异（企业监管数据通常有几十种不同的来源、数据类型和格式）、数据数量以及信息的使用方式。会计和合规专业人员需要在监管数据生命周期的每个阶段发挥其独特的技能，确保数据是机器可读的、可审计的并适应整个数据革命及日后的需要。

准备好了吗：会计和合规专业人员

在这个改变已成新常态的环境下，超越日常管理、构想和设计未来变得愈加重要。

探讨会计和合规专业人员的职能范围与预期变化时，必须考虑对预期变化的准备情况。与前几次工业革命一样，第四次工业革命带来的变革是由外部驱动的，但对商业和信息生态系统来说，转变的速度和范围是空前的。会计和合规专业人员只有适应不断变化的预期与需求，才能够继续发挥其作用。这将意味着，要让经验丰富的专业人员与精通技术且适应发展的专业人员进行合作，充分发挥这两种类型人才的技能。

最终，数字化转型将产生三种类型的会计专业人员：

1. 主动拥抱变革、处于新工具和新技术开发最前沿并做出积极贡献、在企业生态系统所有领域提供增值见解的专业人员。

2. 受变革影响而提升技能、不断适应和学习的专业人员。

3. 落在后面的专业人员，他们不明白自己的职业价值发生了什么变化、为何技能已变得无用。

变革是大势所趋。具有远见的会计和合规专业人员必须为变革做好准备，在数据治理中发挥更加积极的作用。快速变化的业务和商业环境要求我们从根本上改变工作方式，为此，要与数据革命一起，转变思维方式，培养面向未来的技能。

财会专业人员只专注于账目和财务报告的日子已经一去不复返了，如今的会计和合规专业人员有望创造远远超出其原有工作范围的商业价值。他们需要提供自己的见解(基于会计处理的基础数据的质量)，运用知识和经验，参与制定企业战略，并支持企业实现目标。企业还将依靠财会专业人员建立审查和监控机制（并经常执行监控）来衡量企业绩效，在关键节点提供实时建议，避免意外情况发生。围绕利益相关者发生的快速、大规模的变化，加上机器可读数据、云计算、人工智能、机器学习、商业分析、大数据、区块链和分布式账本等工具和技术的日益普及，都为财会专业人员创造了有效适应新的重要管理和战略角色的条件。

标准制定者和政策制定者是否准备好迎接监管数据革命?

为使利益相关者能够有效地使用报告分类标准、一般公认会计原则（GAAP）分类标准或其他报告框架和标准，我们需要相关标准制定者进行数字化结构改革。为确保汇编的内容准确反映标准和报告要求，我们需要针对结构化分类标准与开放技术标准开发一个稳健的全球注册系统，使监管生态系统适应这个新时代的需要。

标准制定者已经在为其结构化机器可读程序开发支持程序。例如，美国会计准则的制定者财务会计准则委员会开发了FASB 会计准则汇编[8]研究系统（汇编研究系统），以简化研究过程。

汇编或权威和非权威的标准及框架应做到如下几点：

1. 减少标准制定者和其他利益相关者解决其研究问题所需的时间和精力。

2. 通过使用一致的编纂标准和支持性文献（与商业产品和服务融合），降低合规风险。

3. 确保准确、实时地更新汇编，然后无缝融合到商业产品和服务中。

[8]FASB, "Project Updates: FASB Accounting Standards Codification," July 1, 2009, www.fasb.org/jsp/FASB/FASBContent_C/ProjectUpdate Page&cid=900000011088.

4. 为标准制定者和其他利益相关者的研究和趋同项目提供帮助。

标准制定者和政策制定者越来越多地要求监管机构、政府、受监管实体、软件供应商、会计和合规专业人员等利益相关方参与合作，制定全球性的、一致的、协调的数据处理与信息交换原则和规则。

欧盟委员会以行动表明了这一点。2012 年，欧盟委员会推出法规适度与绩效项目（REFIT），以促进更好的监管(即智慧型监管)[9]。REFIT 的主要目的是确保欧盟以最低的成本有效且高效地取得重要的立法成果，意在简化欧盟法规，免除不必要负担，并在不影响总体政策目标的前提下调整现有立法。REFIT 平台允许国家主供欧盟委员会审议，以改进欧盟立法，在保持法规效力的同时，进一步降低受监管实体和监管机构的合规成本。

在新的商业生态系统中，标准制定者和受监管实体之间的信息流将日益整合。这就要求建立协调一致的机器可读数据标准，统一基准，并共享全球最佳实践，从而使整个生态系统以最少的信息和沟通治理取得最大的效益。•

准备好了吗：标准制定者和政策制定者

现在，标准制定者和政策制定者比以往任何时候都更需发挥重要作用，在商业报告生态系统中设立明确的、可执行的界限，并在防止生态系统失灵的同时促进经济变革和积极的社会变革。商业法规和相关报告流程是政府得以进行经济监督、制定社会政策和管理税收的基础。要创新政府机构和法定框架内的数据系统和工具、取得新的优化结果，会面临适用性和操作性两方面的挑战，为此，需要进行数据革命。

[9] European Commission, 2012.

通向数据革命之路

要让新数字时代的监管技术和监控技术发挥作用，所有利益相关者都需共同协作，建立一个全新的生态系统。

监管数据的有效性直接取决于受监管实体能否将人员、流程和技术连接起来，产出满足新工业时代需求的预期结果。这一转型的核心是建立一个全球智能分类标准注册系统（GITaR）和一个协作开放分类标准创新平台（CoTIP），来以机器可读格式采集所有财务、非财务、绩效、EER 和合规信息。

建立一种交换和重复使用生态系统内监管数据的通用方法，将是朝着降低合规成本和减少风险目标迈出的重要一步。实际上，只有通过一个利益相关者多方协作的解决方案才可能做到这一点。

问题是：数据革命应该选择哪条道路？

在铁轨铺设之前，轨道车几乎什么价值。同样，进行数字化转型之前，也需先具备两个基本要素：全球智能分类标准注册系统（GITaR）和协作开放分类标准创新平台（CoTIP）

上述解决方案适于在全球范围内使用，可确保信息不会仅仅因为所选软件应用程序的不同而产生不同的理解。构建高效的全球分类标准生态系统取决于几项核心要素（见图 4）。

全球智能分类标准注册系统（GITaR）是一个数据元素集合（为分类标准库，而不是报告信息库），用于向监管机构提交

> “我有一个梦想，网络中的计算机能够分析网上的所有数据，包括内容、链接、人与计算机之间的所有事务。”
>
> ——Tim Berners-Lee（万维网发明者）

重要的财务、非财务报告及其他新兴形式的外部报告，其数据定义具有明确性、一致性和客观性。该系统基于整个商业和全球合规生态系统中协调一致的数据流标准，并可由受监管商业实体向多个监管机构或第三方报告。这些数据元素根据预定义结构进行分类和定义，并（通过一个数据创建和共享机制）与多个监管机构的要求保持一致。

协作开放分类标准创新平台（CoTIP）是一个在全行业通用的中央存储库中创建、整理和共享分类标准的空间。该平台有助于市场注册人始终使用正确的分类标准并使数据定义保持一致，使合规生态系统中的所有利益相关者得以高效交换机器可读电子监管数据。

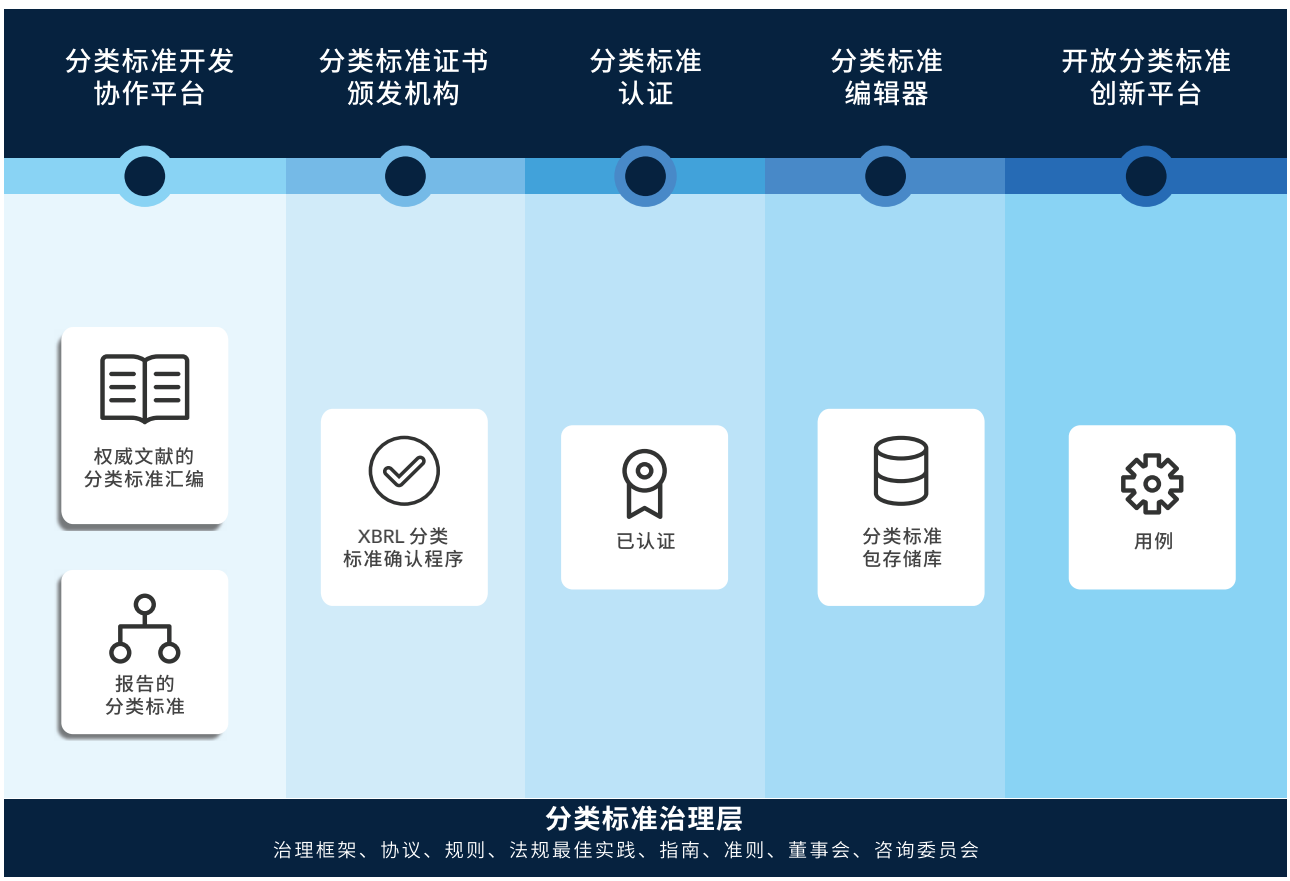
通过全球智能分类标准注册系统（包含结构化数据分类标准认证注册系统）和用于社会公益的协作分类标准创新平台，利益相关者将能积极确保他们正在使用正确的分类标准，使机器可读电子数据更有效、明确地传输到多个监管机构。

这一设想基于物联网（IoT）应用程序中的自动化和共享元数据术语。元数据注册系统的模式声明（declaration of schemas）为语义的发现、理解和交换提供了一种通用方法，从而推进了这一设想。然而，许多注册问题仍尚待明确，对其范围和目的的看法也各不相同。我们认为重点是明确的：有必要建立一个全球智能分类标准注册系统和一个协作分类标准创新平台，来处理重要的财务、ESG（环境、社会和公司治理）、非财务和其他新兴形式的外部报告。

GITaR 和 CoTIP 提供了协作和创建共享分类标准的机制。监管机构、多边机构、教育机构、社会团体、软件开发者和公司皆可通过以下方式受益：

监管机构可使用智能数字分类标准注册系统，从透明度、按管辖范围确定先行指标和滞后指标等方面，比较一家监管机构与其他监管机构（如 ESMA 和 JFSA）的申报质量，从而更快地确定差距。与立法者共享有关差距和机会的信息，无论是从监管还是立法的角度，都可以使 ESG 相

图 4: 全球分类标准生态系统组成要素



关管理更具适应性和实时性。监管机构也可以利用这一全球性系统来确定现有立法中的空白，而不必考虑比较结果。

多边组织可使用智能分类标准数字注册系统来确定同类最佳政策，鼓励提升透明度，并按管辖范围确定先行和滞后指标，从而更有效地发现机会或差距。这使其可以与其他多边组织或利益相关的公共机构合作，就共同关心的问题制定适应性强的、实时的综合政策、新的法律或修正案。公共部门的利益相关者也可以利用这一全球性系统来确定立法方面的空白。

教育机构可使用智能数字注册系统来确定 ESG 主题的研究领域、差距或需求，以及利用注册系统和创新实验室开展各方面的研究。

社会团体可使用智能数字注册库来了解现行的标准，之后再独立分析和了解报告实体，进而推动社会变革。比如，环保组织会使用这个智能数字注册库来确认新的 ESG 主题领域，这些领域需要环保组织着力提高公众意识并推动积极的社会变革。

软件开发者可使用数字智能注册系统和经认证的分类标准来支持应用程序编程接口（API）或软件即服务（SaaS）的开发，从而为报告和申报材料提交提供最新、最强大的工具。借助解决方案，SaaS 客户可以根据全球最佳实践或其他可选实践开展基准测试。此外，这还可以促进自愿披露，推动监管改革。

公司或报告编制人员可通过以下方式，以具有成本效益、高效率的方式确定和实施最佳实践：

- 在行业部门内共享有关环境和社会问题的关键术语与定义，使报告与审计框架相一致。
- 与利益相关者合作，应对人工智能相关的挑战，并创造使人工智能更具包容性和可访问性的语言。
- 就如何为那些岗位被自动化取代或淘汰的员工提供再培训分享最佳实践。
- 建立一致的碳排放报告指标。例如，目前一些航空公司按每个航班报告碳排放量，而另一些公司则按每位乘客或按收入来报告碳排放量。
- 智慧自动化实施之后，可以使用实体运营所在国家、市场和行业部门的相关输入信息来确定通用的报告方法和合作伙伴。

利益相关者的大力参与和领导

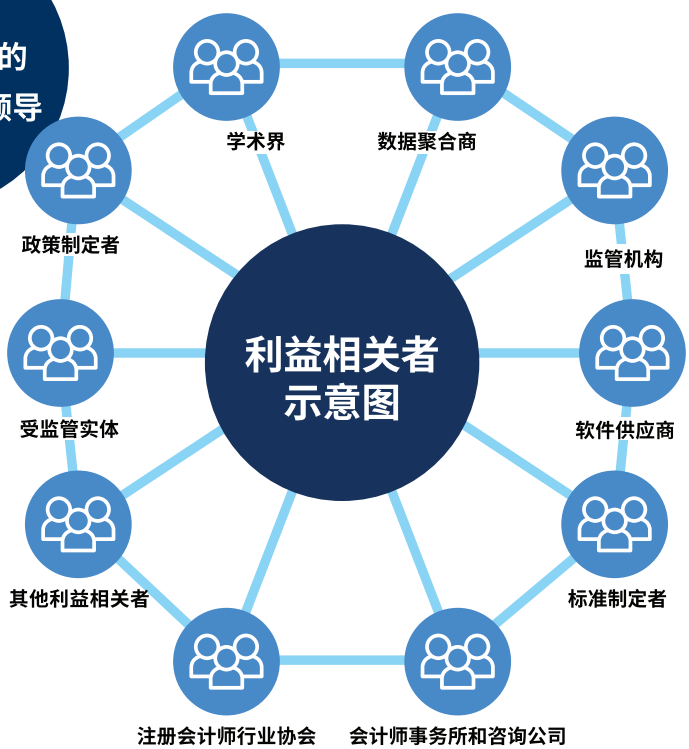
第四次工业革命所需的变革，离不开强有力的领导和所有利益相关者的支持，全球报告框架的发展也是如此。关键利益相关者见图 5。

全球报告框架为监管机构和受监管实体提供了一种明确的、具有成本效益的、可靠的、适应性强的方法，用于在这两者间交换机器可读的商业信息。这个贯穿整个生态系统的数字化监管报告中心平台优化了端对端合规流程，同时还能满足地方、州、联邦和其他报告的需求。（例如，美国几个州采集地方政府的财政统计数据，因为地方一级的数据汇编流程可能不具备经审计的监管数据报告的及时性和一致性）另一个体现效率提升的方面是监管数据的自动化验证，软件程序可以利用 XBRL 格式申报的信息来进行信息验证，从而更快地发现舞弊。

法规和监督的范围在逐步扩大，而报告的时限却在缩短，因此，报告供应链的数字化成为一种必然趋势。为履行工作职责，监管监督机构需要从其所监管的实体处获得可靠、一致和准确的监管数据。经全球智能分类标准注册系统认证的分类标准，可确保报告框架库中的数据定义的统一。让受监管实体创建一份报告来满足多个政府机构的多重监管要求，便是使用 XBRL/sdmx 收集商业和财务信息的效率所在。

分类标准开发以计算机应用程序可理解的形式对商业信息的含义进行建模（即在给定的知识域内对概念、术语和关系的正式描述），并得到公共和私营部门领导层的大力参与。

图5：
利益相关者的
大力参与和领导



行动呼吁

通过加快构建报告系统，全球市场参与者可获得财务和非财务两方面的收益。该报告系统将来自单个组织内部的正确信息持续传递给投资者、监管机构、政策制定者和其他用户。该信息链上的每个利益相关者都可以通过采取以下行动进一步推动数字化转型：

- 成立一个致力于监管报告数字化转型的利益相关者工作组。

- 确保标准制定者、框架开发人员和最佳实践将存储库作为行业报告与合规知识体系的数字分类标准权威。

- 制定高级别解决方案蓝图，以便在产品中使用全球数字化框架。运用对监管生态系统及其范围的深入理解，评估数字化转型项目为政策制定者和监管机构带来的价值。

- 确保软件供应商和服务供应商开发一个初步系统解决方案，并测试报告需求能否得到满足。

结论

对于受监管实体、标准制定者、政策制定者、投资者和其他利益相关者来说，数据就是生命线。原始数据的质量我们行业的信誉和可持续发展。缺乏高质量、及时、机器可读的数据，我们就无法知道一家公司的碳排放量是多少、一个国家有多少自然资本可用于经济发展、公司在从事什么交易，以及对公司产品的需求是在扩大还是受到了不利影响。

数据资产的总体状况直接取决于公司是否有能力将人员、流程、业务线和技术联系起来。所有这些因素必须共同作用，以产出期望结果，使数据符合预期使用目的。

在这个日益复杂的世界中，受监管实体越来越一体化，受监管环境的影响，同时又反过来影响着监管环境。未来的领导者将是那些更快地理解数据及信息影响，利用新工业时代提供的所有工具、技术和流程，以最有效的方式采取行动的人。这些领导者需要为整个企业制定综合的可持续业务发展战略，并采用一套能满足监管者、审计人员和业务运营要求的综合控制和合规监控机制。他们将是鼓舞人心的数字化转型推动者，而不是监督者；他们将帮助所在组织以敏捷、充满活力的方式管理内外部的变化。

目前，审计行业所受的公众监督力度空前之大。提高数据质量方面的需求推动着数据治理项目的发展。随着强化法定审计报告质量的新监管要求的出台，任何实体都不愿意冒风险，使薄弱的数据治理成为如国际审计准则 ISA701 所述的“关键审计事项”（KAM）。对于竞争性经济体来说，真正的效益只有通过针对多个利益相关者的跨政府部门举措——或者说领导力支持——才能实现。

会计和合规专业人员掌握着内部和外部报告中驱动企业发展的关键数据，他们将在第四次工业革命中发挥不可估量的作用。

第四次工业革命中的数字化转型并非新名词，但它的冲击力正以前所未有的方式波及各个行业。商业报告、会计和审计无疑是接下来必须适应数字化数据革命的领域，会计和合规专业人员在利用数字化转型方面具有独特的优势——也许比任何其他行业都更具优势。•

了解 IMA 更多信息，请访问：www.imachina.org.cn。

[10]International Auditing and Assurance Standards Board, Determining and Communicating Key Audit Matters, July 6, 2016, www.iaasb.org/publications/determining-and-communicating-key-audit-matters-4.

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IMA® (Institute of Management Accountants) is a global professional association focused exclusively on advancing the management accounting profession.

For more information, please visit **www.imanet.org.**

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FOREWORD

IMA® (Institute of Management Accountants) is a global association that has been an innovator and first mover in the world of nonfinancial performance measures, digital technologies, and "data"—governance, analytics, and delivery. IMA is a co-founder of the XBRL (eXtensible Business Reporting Language) standard, a founder of the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and an active voting member of the International Federation of Accountants (IFAC) and the International Integrated Reporting Council (IIRC). As a former CFO of a major telecom and now CEO of a global organization, I strongly support the call to action and sense of urgency in this paper to use open data standards, taxonomies, digital delivery technologies, and guidance to enable more connected and less fragmented reporting. These technologies can modernize corporate reporting by eliminating inefficient, inconsistent formatting and streamline the most informative data from source to user. Nothing less than more actionable, relevant, and trustworthy data is at stake to enrich ethically sound individuals, organizations, capital markets, and society at large. •

Jeffrey C. Thomson, CMA, CSCA, CAE
President and CEO, IMA

FOREWORD

This paper calls for a data revolution!

Climate change is transforming the way in which citizens, consumers, investors, regulators, and other stakeholders expect companies to report. No longer are financial reports considered sufficient. Nonfinancial or prefinancial information is now recognized as imperative to more broadly assess value formation and inform stakeholders. At the same time, digitalization—the Fourth Industrial Revolution—has transformed and continues to transform global markets. The intersection of these disruptions will substantially change the way corporate reporting addresses the value paradigm required in the 21st Century.

A plethora of measurement methods and standards has emerged to measure nonfinancial data. Some methods are aligned, some fragmented, and some contradictory. A great deal of work is being done to address this, such as the Corporate Reporting Dialogue's Better Alignment Project. Under the auspices of the International Integrated Reporting Council, it has made significant progress in defining alignment.

While alignment is vitally important, it needs to be supplemented with 21st Century technology to fully enable the efficiencies, clarity, and certainty necessary to rebuild trust in global markets and market participants, and to address the challenges of the emerging technological disruptions and climate change.

Developments in machine learning, for example, will transform reporting, oversight, auditing, and monitoring systems. That will improve accessibility, clarity, measurement, and quality, thereby facilitating comparability and enabling the liberation of data currently locked in siloed reports, formats, and platforms.

This paper outlines the data revolution needed to provide trustworthy, auditable, accessible, and machine-readable information that is automatically updated using open data standards (such as XBRL or eXtensible Business Reporting Language) and the creation of a global taxonomy registry and an open taxonomy innovation platform.

One possible addition could be the creation of a global technology-based matching engine to match funders and researchers in the important area of data analytics, which could supplement the initiatives outlined in this paper.

These developments, along with alignment, will enhance the measurement of value creation and enable business model sustainability comparisons, which are currently difficult to achieve. It will facilitate auditability of nonfinancial information and therefore enhance and facilitate the adoption of integrated reporting globally.

This paper outlines impacts and opportunities for sustainability practitioners, accounting professionals, regulators, investors, and other users of corporate reporting. The accounting and compliance professionals who master the critical data in internal and external reports that drive the business will be invaluable in the Fourth Industrial Revolution.

This important paper is an exciting solutions-based contribution to the discussion on how the much-needed data revolution could be achieved. •

Jane Diplock, AO (Officer of the Order of Australia)

Chair, Governance and Nominations Committee, International Integrated Reporting Council

Director, Singapore Exchange

Member, Public Interest Oversight Board

Former Chair, Executive Committee, International Organization of Securities Commissions

Chair, Abu Dhabi Global Market Regulatory Committee

EXECUTIVE **SUMMARY**

Every organization wants and expects a clean bill of health in their corporate compliance and reporting.

The World Economic Forum has asserted that we are entering the "Fourth Industrial Revolution," as emerging technologies and unprecedented connectivity blur the boundaries between people and the digital and physical worlds.[1]

At the heart of this digital transformation for finance and accounting teams is the potential for information technology and open data standards to reduce lags and latencies in business reporting and compliance processes. Data standards, such as the XBRL (eXtensible Business Reporting Language) standard, and innovations such as blockchain, cloud computing, and natural language processing can increase efficiency, underpin new competitive opportunities, and, notably, ensure auditable data, readying entities for the Fourth Industrial Revolution.

Regulated entities, wherever they are in the world, have been subject to an increasing amount of fragmented regulatory regime changes, legislation, reviews, and queries. The ramifications of failing to satisfy the reporting demands of regulators are costly: penalties, undesirable news coverage, the cloud of operating under an MRIA (Matter Requiring Immediate Attention), or, in some cases, suspension of operating licenses.

The fragmented and divergent regulatory ecosystem is a core challenge often associated with material compliance risks and costs. The last decade has seen local regulators around the world ask for more information and toughen compliance

[1] Klaus Schwab, "The Fourth Industrial Revolution: what it means, how to respond," World Economic Forum, January 14, 2016, www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/.

requirements for filing entities. This shift demands a tech- and data-driven approach for monitoring activities, with machine-readable data and the power of computer algorithms to run checks, keep records, and systemize processes.

The U.S. Securities & Exchange Commission (SEC) has stated that on any given day, as much as 85% of the documents and XBRL data visited in the SEC's Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) is done so by bots. Technologies and computing have dramatically increased processing speeds and volumes of information sent between entities and regulators. The acceleration of analysis of critical data provides substantial economies of scale and competitive advantages.

The International Federation of Accountants (IFAC) estimates fragmented regulations cost the financial industry sector alone $780 billion annually.[2] IDC has predicted that worldwide data will grow 61% per year, from 33 zettabytes to 175 zettabytes by 2025.[3] In another recent study, IBM estimated annual costs incurred from low-quality data in the United States alone in 2016 reached $3.1 trillion. These staggering numbers highlight the critical need for accounting and compliance professionals and processes to transform in order to overcome these challenges—and do so fast.

Accounting and compliance will remain relevant in this new age only if we connect the data dots so that critical financial, nonfinancial, and other emerging forms of external reporting (EER) are collectively accurate, auditable, complete, consistent, and fit for purpose.

Given the pressures of managing a multitude of regulations coupled with the risk of material fines and the growing cost of managing it all, the costs and risks of compliance and reporting are real.

Over the past 18 months, Workiva, provider of the world's leading connected reporting and compliance platform, conducted an in-depth United Kingdom banking entity research study to better understand the challenges faced by regulated entities in the areas of risk, cost and resource management, efficiency, compliance, and reporting-yielded results universally relevant to all industries. The banking study involved assessment of all major statutory reporting platforms, forms, and the regulatory compliance ecosystem. The insights gleaned around compliance practice commonalities and recurring issues faced by entities across different sectors and geographies highlighted potential optimization opportunities across the end-to-end compliance process to achieve a holistic and integrated outcome.

One message is clear: Forward-thinking accounting and compliance professionals will implement solutions where mundane repetitive tasks, such as data entry that is standardized and of low-level complexity, will be automated. The automation will allow these professionals to focus on value-added business activities such as strategic business support and growth. Providing better data for statutory reporting and compliance is a shared commitment that calls for a collaborative data revolution.

In this paper, we make a bold statement that the accounting and compliance professionals who master the critical data in internal and external reports that drive the business will be invaluable in the Fourth Industrial Revolution. •

[2] "Fragmented Financial Regulation: A $780 Billion Tax on the Global Economy," IFAC, April 11, 2018, www.ifac.org/knowledge-gateway/contributing-global-economy/discussion/fragmented-financial-regulation-780-billion.
[3] David Reinsel, John Gantz, and John Rydning, *The Digitization of the World From Edge to Core*, IDC, November 2018, www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf.

INTRODUCTION

Government agencies and regulatory authorities are under increasing pressure to reduce the costs of compliance, both to create economic conditions for business growth and capital allocation and to reduce operating expenses that are typically funded by treasury departments that must do more with less.

In regulatory and statutory reporting, only two moments really matter: the moment of data creation and the moment a piece of data is used. The technological processes around these two moments are referred to as "RegTech" for regulatory technology and "SupTech" for supervisory technology. More specifically, RegTech means the enhanced management of regulatory reporting and compliance processes through technology. Following this definition, the term "RegData" refers to the individual data points that an entity submits to a regulatory agency to comply with disclosure requirements. SupTech means tech-enabled supervision, review of inspections, and data analysis by regulatory agencies.

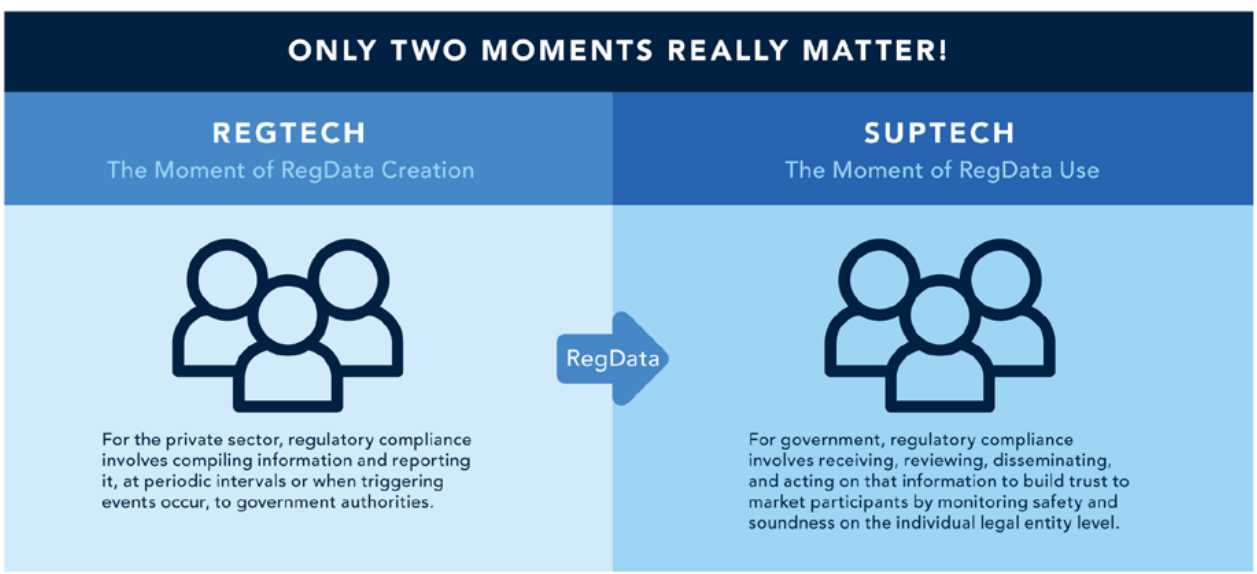
As noted by the *OECD Regulatory Compliance Cost Assessment Guidance*, compliance costs are incurred by both regulatory authorities and regulated entities.[4]

Regulatory authorities incur costs for publishing, administering, monitoring, and enforcing regulations, including the costs of:

- Developing and implementing licensing or registration systems.
- Assessing and approving applications.
- Processing renewals.
- Implementing inspection or auditing systems.
- Implementing systems for sanctions for noncompliance.

Meanwhile, regulated entities incur costs to comply with regulatory and information obligations, defined as obligations to provide statutory information and data to regulators or designated third parties, or to have information readily available for inspection or supply upon request by a regulatory examiner. Additionally, many regulated entities must retain unique capabilities to satisfy obligations for a multitude of regulatory formats and bodies.

This fragmented and divergent regulatory ecosystem is a core issue associated with existing compliance and statutory reporting costs and risks. •

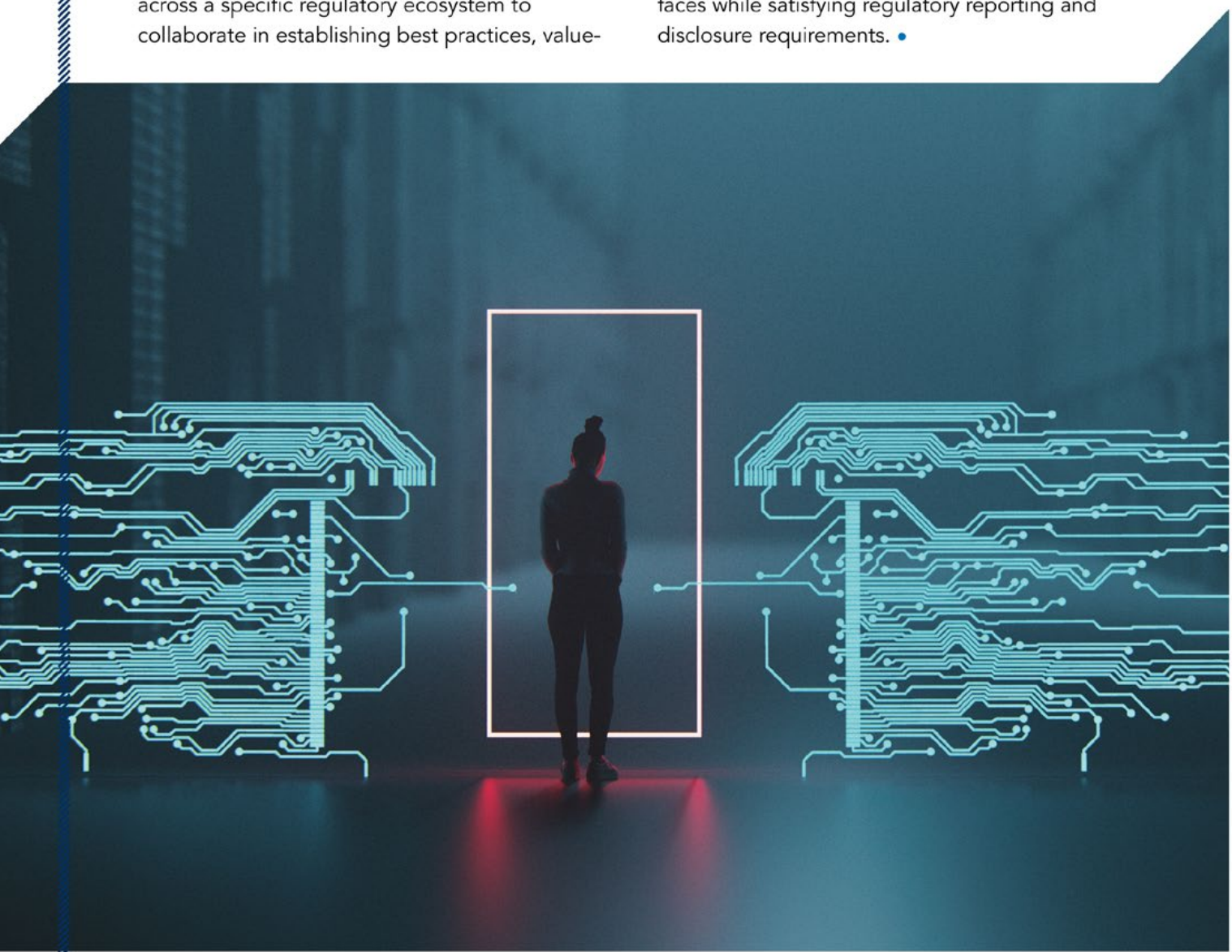


[4] OECD, *OECD Regulatory Compliance Cost Assessment Guidance*, 2014, www.oecd.org/gov/regulatory-policy/compliance-costs.htm.

Fragmentation and **Divergence Challenges**

The purpose of this paper is not to exhaustively address the spectrum of issues and solutions for easing these fragmentation and divergence issues. It identifies key issues with an intent of stimulating dialogue between regulators, standard setters, regulated entities, preparers, multilateral organizations, accounting bodies, and other stakeholders across a specific regulatory ecosystem to collaborate in establishing best practices, value-enhancing goals, and a path for shaping the future of the statutory reporting and compliance ecosystem.

In a recent in-depth research study designed to understand the key challenges for regulated entities and gain a holistic view of their compliance, reporting, and monitoring requirements, Workiva uncovered the real challenges a regulated entity faces while satisfying regulatory reporting and disclosure requirements. •



Research Study Overview

Workiva conducted a comprehensive in-depth study of a compliance microsystem, namely the banking sector of the United Kingdom (U.K.). It involved compiling, documenting, and assessing all major regulated data (RegData) submissions platforms and forms within the U.K. banking sector compliance framework. The study highlighted the nuances of all elements and interactions across various stakeholders for banks in the U.K. in satisfying regulatory compliance.

U.K. banks report to at least 10 regulators via 14 submissions platforms, and information is spread across more than 300 forms using at least seven data formats and more than six modes of submission with differing periodicity and frequency (see Figure 1). This starts to shed light on the level of complexity and the variables involved with the regulatory and compliance framework. With these outcomes, the impetus to transition to a cohesive and simplified compliance ecosystem is apparent.

The key fragmentation issues in statutory reporting in the RegData ecosystem are outlined in the following pages. They are the main challenges to accounting and compliance professionals in the Fourth Industrial Revolution.

RegData ecosystem fragmentation

The RegData ecosystem is fragmented at various levels and variables, including data formats, modes of submission, data definitions for certain common elements, business rules, access controls, and validations for similar reporting elements across different forms and regulators. We have classified the fragmentation under six headings.

FIGURE 1: THE U.K. BANKING SECTOR COMPLIANCE FRAMEWORK BY THE NUMBERS

10+	Regulatory Authorities
14+	RegData Submissions Platforms
300+	Forms and Disclosure Documents
7+	Forms and Disclosure Data Formats
6+	Modes of Submission

1 REGDATA PROCESS

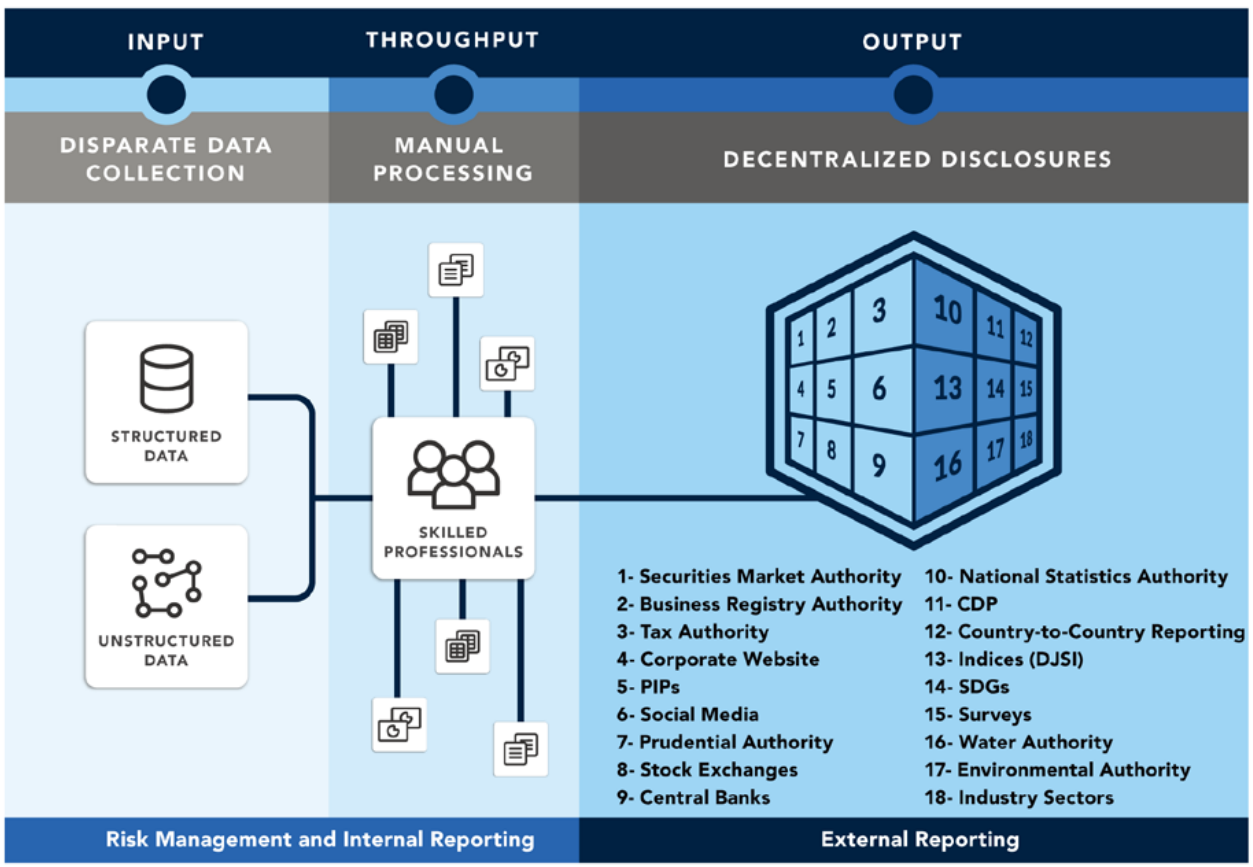
We all know that output from one system is input into another system. The flows and interfaces between input, throughput, and output across various systems are not aligned and often require manual intervention to ensure that the output of one system is reprocessed in the necessary format to be validated for submission to the next system (see Figure 2). It is further connected to multiple output reports, where the need to ensure a single source of truth is essential. For example, the data from a regulated entity's enterprise resource planning (ERP) software needs to be compiled and repackaged in order to meet a regulator's "form" and "data format" requirements for filing submissions.

Seamless integration between these internal and external interfaces depends on codified standards for data generation, validation, and sharing.

2 DATA TYPES

This is the most common area of fragmentation. Data held in an ERP system consists of one type, which often must be converted into a different type in order to be transmitted into another system. Different regulators require the same information in their specific formats or data types. Surprisingly, some individual regulators call for the same information in different forms and in different data formats. The assembling, dismantling, and repackaging of data in the required format can cause compliance issues

FIGURE 2: REGULATORY REPORTING AND COMPLIANCE FRAGMENTED ECOSYSTEM



and unintentional information errors when filing.

Adoption of common codified standards for machine-readable data creation and exchange across all stakeholders within the compliance ecosystem will result in a giant leap toward coherence in the RegData flow.

3 STANDARDS AND SUPPORTING DOCUMENTS

Regulators adopt unique standards, data definitions, and business validation rules for similar RegData elements. A lack of cohesion in standards across regulators results in higher entity and regulatory costs in terms of time and resources. It also weakens auditability of information disseminated to a multitude of regulators and increases risks due to increased subjectivity, differences in interpretations, misinformation, and inadvertent partial compliance or noncompliance.

The solution requires a collaborative multi-stakeholder approach with regulators, governments, regulated entities, accounting bodies, software vendors, advisory firms, data aggregators, and accounting and compliance professionals to establish global, uniform, and harmonious principles and rules for data processing and information exchange, underpinned by a strong governance framework.

4 TECHNICAL STANDARDS

Different regulators have different access controls, validation rules, and data format specifications. These differences increase the complexity within a compliance ecosystem.

Standardization and harmonization of technical standards will smooth how data sets flow across stakeholders and provide further assurance on the accuracy and reliability of the data.

5 SUBMISSION MODES

The modes of regulatory information submission differ for different forms and types of information. This creates additional hurdles both in creating standardized last-mile reporting validation rules and in creating seamless integration across internal and external systems.

A unified platform or repository for submission of information by regulated entities and for the subsequent collection of information by regulators, investors, and other stakeholders will make the RegData flows more robust and reliable.

6 DATA DEFINITIONS

Data definition fragmentation is more prevalent when reporting the same information to multiple regulators. The fragmentation occurs from the lack of clarity in communication and the lack of a single set of standards and definitions across multiple regulators. It is not uncommon to find differences in interpretation of the definition of various data elements among regulators. This naturally lends itself to an increased risk of misstatement and miscommunication and a corresponding increase in regulated entities' compliance costs for having to maintain multiple variants of the same

data items (from entities having to validate each time they submit to the various regulators).

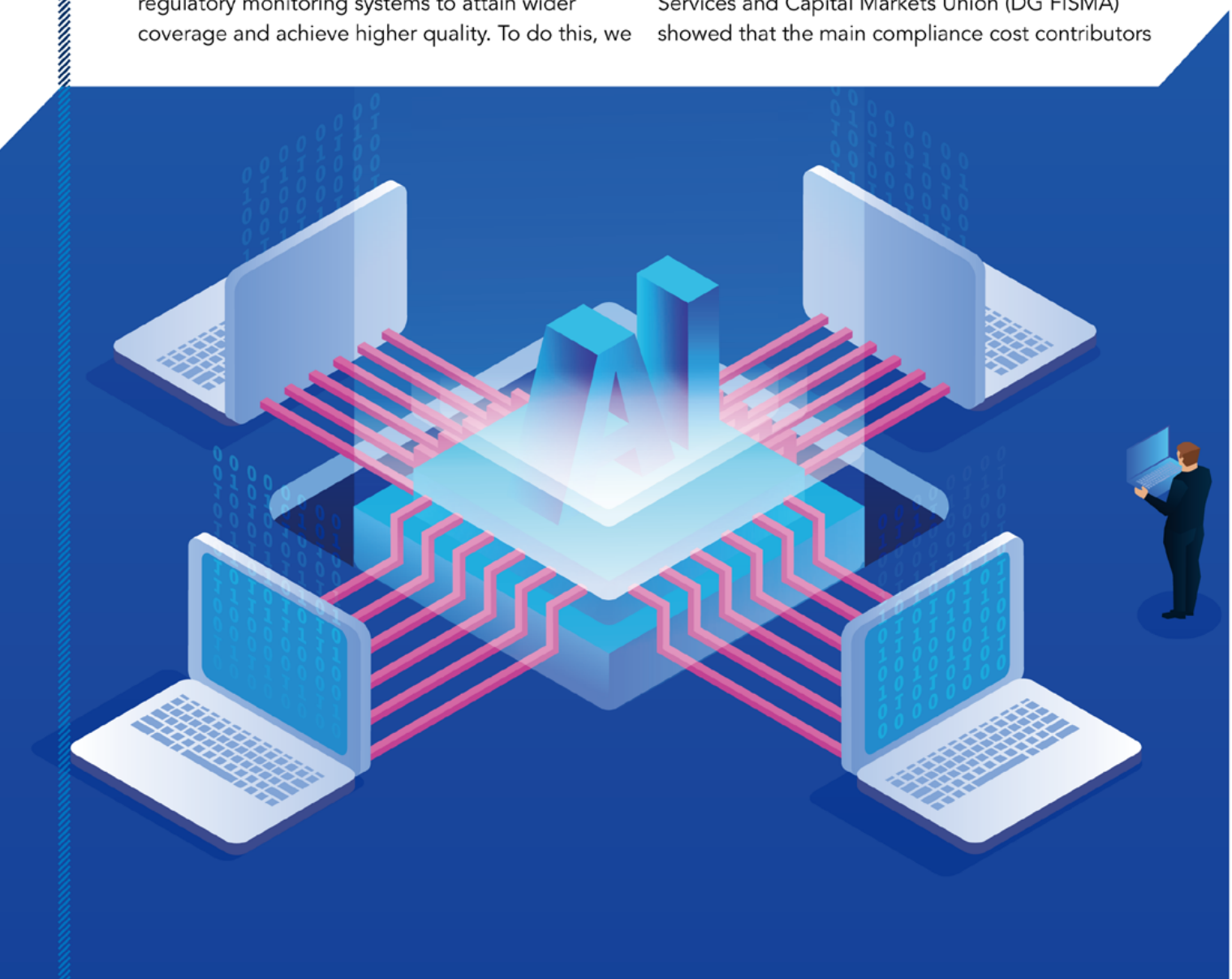
Collaborative communication, harmonization of standards and data definitions, and submission of information to a single repository would reduce fragmentation issues due to data definitions.

The aforementioned fragmentation challenges increase the need to rely on machine-readable data systems for compliance. Efficient compliance requires digital transformation and adoption of both RegTech and SupTech. •

The Need for a **RegData Revolution**

At the heart of the Fourth Industrial Revolution, in this paper's context, is the need to ignite the next generation of RegTech and SupTech innovations—machine learning as a path toward true artificial intelligence (AI). AI will enable quantum improvement for an entity's reporting process as well as transform regulatory monitoring systems to attain wider coverage and achieve higher quality. To do this, we need auditable data—and lots of it. Presently, data is often closely coupled to specific applications. Keeping data for emerging forms of external reporting (EER) locked in static software platforms is no longer sustainable.

A recent study by the European Commission Directorate-General for Financial Stability, Financial Services and Capital Markets Union (DG FISMA) showed that the main compliance cost contributors



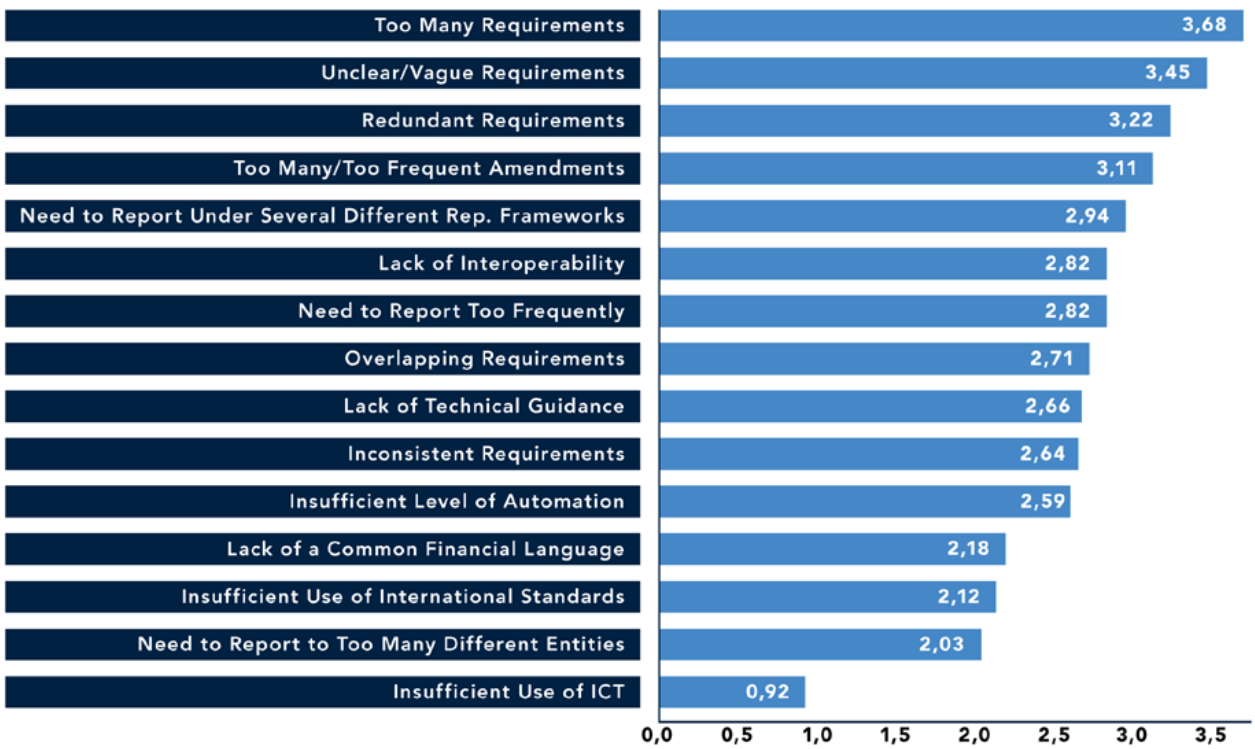
are fragmented requirements (see Figure 3).

The number of reporting requirements and frameworks, and an insufficient level of automation are among key fragmentation issues, leading to fragmented data sources and formats. The recording and reporting of assets including cash and property have grounded commerce since ancient times. Data recording has seen the likes of clay tablets, papyrus, vellum, paper, and bytes. The most notable innovation during the centuries of recordkeeping is computerization, which transferred the recording process from paper to bytes.

The evolution of regulatory reporting includes moving from paper-based hard copies and PDF versions with limited interactive features to digital publications with simulated page turning, web-based collections of information, and digital downloads of report sections. The wide range of formats directly influences stakeholders' ability to locate, extract, and analyze information necessary for decision making.

In 1978, VisiCalc introduced the first spreadsheet allowing accountants to transition from paper-based ledgers to digital ledgers.[5] In the early 1990s, few had heard of the internet let alone had an inkling of the disruption it would bring to the accounting profession. Technology is increasing the speed and dynamic nature of the accounting and compliance profession, fundamentally changing the way we store, create, and submit RegData.

FIGURE 3: COMPLIANCE COST CONTRIBUTORS



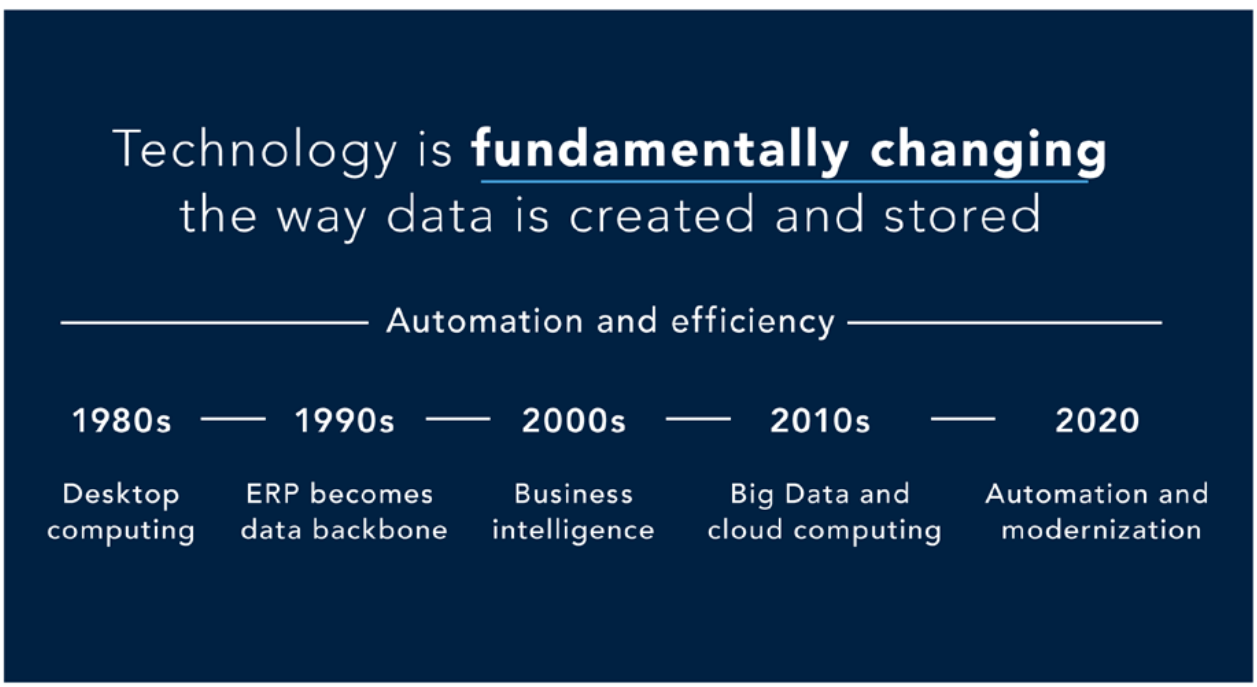
Source: European Commission, "REFIT--making EU law simpler and less costly," 2012, ec.europa.eu/info/law/law-making-process/evaluating-and-improving-existing-laws/refit-making-eu-law-simpler-and-less-costly_en.

[5] Christopher Mims, "40 Years Later, Lessons From the Rise and Quick Decline of the First 'Killer App'," *The Wall Street Journal*, July 13, 2019, www.wsj.com/articles/40-years-later-lessons-from-the-rise-and-quick-decline-of-the-first-killer-app-11562990402.

Paper documents, HTML reports, and PDF files require manual information extraction and data entry into software for users' decision-making needs—a time-consuming, error-prone, inefficient, and costly process. Contrast that with machine-readable RegData, which is easily and quickly consumed by software tools and search engines, freeing time for value-added analysis and interpretation by regulators, investors, or other stakeholders.

Regulated entities, governments, and regulatory authorities are increasingly beginning to recognize the need to discard information processing and reporting ways of the past. They are seeing the need to leave behind inflexible paper-based documents or proprietary digital data formats and embrace open data standards, such as the XBRL (eXtensible Business Reporting Language) standard and those set by SDMX (Statistical Data and Metadata eXchange). The benefits of such a move include streamlining regulatory reporting requirements to not only reduce the burden on industry but also ease the administrative and compliance oversight for regulators and ensure greater transparency, as detailed by The Center for Open Data Enterprise in its *Open Data Transition Report*.[6]

This new breed of reporting is poised to disrupt information production from both an information technology and a data governance perspective. The shared commitment for better data for statutory reporting and compliance calls for a collaborative data revolution. •



[6] The Center for Open Data Enterprise, *Open Data Transition Report*, October 2016, reports.opendataenterprise.org/transition-report.pdf.

The Aim of the **Data Revolution**

At its most basic, the aim is trustworthy, auditable, accessible, and machine-readable information that is relevant to user groups, timely, and automatically updated. This transformation depends on strong coherent data governance around all business reporting data and compliance frameworks.

The accounting and compliance professions, in both the private and public sector, will need to continuously reinvent their business reporting processes and oversight functions with connected technology at the core. Failing to do so will result in some watching from the sidelines as the profession is disrupted by individuals, organizations, and regulatory authorities proficient with digital transformation innovations. The drivers for change will come from three groups: (1) regulatory authorities; (2) accounting and compliance professionals; and (3) standard setters and policy makers.

Are regulatory authorities ready for the data revolution?

Regulators around the world are demanding greater use of structured, open-source (nonproprietary), and machine-readable data in company reporting. For example, the U.S. Securities & Exchange Commission requires public companies to include XBRL "structured financial data" in annual and quarterly reports, allowing investors to automate extraction of the entity's filed information in current and prior years, as well as information from other companies or industry averages.

The XBRL format is the international open-source, royalty-free data standard designed specifically for digital reporting of financial, nonfinancial, performance, or other EER and compliance information. The XBRL format provides a unique, machine-readable tag for individual disclosures within statutory reports.

Another extended example of the XBRL mandate is shown with the Japan Financial Services Agency (JFSA). JFSA has established an ambitious plan to put SupTech to use in improving the sophistication and efficiency of its supervision activities.[7] The agency wants

to use innovative digital initiatives to improve information collection, accumulation, and analysis, and reduce duplicative work.

For example, there are current overlaps between the information collected by the Bank of Japan and JFSA. A secure, standardized system for sharing this data would improve efficiency for all stakeholder groups. How is JFSA planning to do this?

To achieve the desired transformation, JFSA plans to better use granular structured XBRL data by collecting and sharing certain detailed data between regulated institutions and their supervisors. The goal is to facilitate a more data-driven approach to regulation that positively impacts the Japanese economy.

Additionally, JFSA plans to introduce robotic process automation (RPA) to replace a range of arduous data sorting, aggregation, and analysis tasks undertaken manually by examiners. RPA is perhaps both the most innovative and the most challenging proposal put forward by a global regulator for the management of granular structured data collection. It is an ambitious plan to enable efficient, integrated, and in-depth financial regulatory monitoring.

Other securities regulators, stock exchanges, business registries, and taxing authorities

READY OR NOT: REGULATORY AUTHORITIES

The pace of change in this industrial revolution requires that a regulator quickly spot risks, identify emerging market trends, and understand how emerging financial products and evolving market conditions are affecting investors and the economy within and outside their borders. This need to proactively sharpen regulatory analysis and foresight requires a data revolution. Tweaking the edges is no longer an option.

[7] Japan Financial Services Agency, *Status of digitalization efforts in financial monitoring*, June 2019, www.fsa.go.jp/en/news/2019/20190703_joubun/01.pdf.

(including Australia, Brazil, Canada, China, Denmark, Finland, Germany, India, Israel, Japan, the Netherlands, Singapore, South Korea, Spain, and the U.K.) already require XBRL filings. In addition, the European Securities and Markets Authority (ESMA) mandates Inline XBRL for its European Single Electronic Format (ESEF) taxonomy. This change, effective for annual reports ending on or after January 1, 2020, affected more than 5,000 European Union (EU) issuers.

Are accounting and compliance professionals ready for the data revolution?

The RegData-centric approach inevitably puts more emphasis on data management and data governance for accounting and compliance professionals.

Regulatory reporting is no longer a siloed activity. Changes within the compliance and reporting environment create the need for holistic, connected compliance monitoring and reporting. The specific implementation of the RegData life cycle will vary significantly by regulated entity. It will depend on the nature of the data, its system disparity (enterprise RegData is often housed in dozens of different sources, data types, and formats), the quantity of data, and the way the information is consumed. Accounting and compliance professionals need to contribute their unique skills at every stage of the RegData life cycle to ensure data is machine-readable, auditable, and

READY OR NOT: ACCOUNTING AND COMPLIANCE PROFESSIONALS

In a world where change is the new constant, it is more and more important to transcend day-to-day management in order to imagine and define the future.

When exploring a change in scope and expectations for accounting and compliance professionals, we must consider readiness for the changes expected. The changes in the Fourth Industrial Revolution are externally driven, as in other industrial revolutions, but unique in the speed and scope of transformation in both business and information ecosystems. Accounting and compliance professionals will remain relevant only to the extent that they can adapt to changing expectations and needs. It will mean teaming experienced professionals with tech-savvy and increasingly flexible developing professionals to get the best out of both types of skill sets.

Ultimately, digital transformation will result in three types of accounting professionals:

1. Those proactively embracing change, staying at the forefront of developing new tools and techniques to contribute positively, and providing value-added insight in all spheres of the business ecosystem.

2. Those who adapt and learn as they go, upskilling in real time as changes are in play.

3. Those left behind wondering what happened to their professional value and why their skills have become redundant.

Change is inevitable. The forward-thinking accounting and compliance professionals must prepare for changes and play an even more active role in data governance. The fast-changing transactional and business landscape demands fundamental alterations in the way we work. The answer is a paradigm shift in the development of future-ready skills coupled with a data revolution.

fit for purpose through this revolution and beyond.

Gone are the days when the role of accountants and finance professionals mainly revolved uniquely around accounts and financial reporting. Today's accounting and compliance professionals are expected to provide business value contributing far beyond their original scope of work. They are called upon to provide their insights—dependent on the quality of the underlying data processed by accounting—apply their knowledge and experience, partner on business strategy, and support the business to achieve targets. They are also depended on to develop mechanisms of review and monitoring (and often conduct that monitoring) to measure business performance, offering real-time advice on pivots to avert surprises. The pace and scale of change taking place around stakeholders coupled with the increasing availability of tools and techniques, such as machine-readable data, cloud computing, AI, machine learning, business analytics, Big Data, blockchain, and distributed ledgers, provide the means to effectively adapt to new key management and strategic roles.

Are standard setters and policy makers ready for a RegData revolution?

In order to enable efficient stakeholder access to reporting taxonomies, taxonomies of authoritative Generally Accepted Accounting Principles (GAAP), or other reporting frameworks and standards, we need a digital structural overhaul for affected standard setters. To ensure that codified content accurately represents standards and reporting requirements, we need to develop a robust global registry of structured taxonomies and open technical standards to enable a regulatory ecosystem fit for purpose in this new age.

Standard setters are already developing supporting programs for their structured machine-readable programs. For instance, the U.S. GAAP standard setter, the Financial Accounting Standards Board (FASB), developed the FASB *Accounting Standards Codification*® Research System (Codification Research System) to streamline research processes.[8]

Codification or authoritative and nonauthoritative standards and frameworks are expected to:

1. Reduce the amount of time and effort required to solve research issues for standard setters and other stakeholders.

[8] FASB, "Project Updates: FASB *Accounting Standards Codification*," July 1, 2009, www.fasb.org/jsp/FASB/FASBContent_C/ProjectUpdatePage&cid=900000011088.

2. Mitigate the risk of noncompliance through consistent use of the codified standards and supporting literature, all of which are integrated into commercial products and services.
3. Ensure accurate and real-time codification updates that are then seamlessly integrated into commercial products and services.
4. Assist standard setters and other stakeholders with their research and convergence projects.

Standard setters and policy makers are increasingly calling for collaborative stakeholder engagement of regulators, governments, regulated entities, software vendors, and accounting and compliance professionals in order to develop global, consistent, harmonious principles, and rules for data processing and information exchange.

To illustrate this in action, the European Commission considers its responsibility a shared one. It published the European Commission's regulatory fitness and performance (REFIT) in 2012 to encourage better regulatory programs (i.e., smart regulation).[9] REFIT is primarily aimed at ensuring EU legislation delivers meaningful outcomes effectively, efficiently, and at minimal cost. REFIT is intended to keep EU laws simple, to remove unnecessary burdens, and to adapt existing legislation without compromising overarching policy objectives. The REFIT platform allows national authorities, citizens, and other stakeholders to make suggestions for commission consideration in improving EU legislation to further reduce compliance costs on regulated entities and regulatory authorities without losing efficacy.

Standard setters will experience increasing integration of information flows between standard setters and regulated entities in the new business ecosystem. This prompts the need to establish harmonious machine-readable data standards, align benchmarks, and share global best practices to attain the maximum benefit with minimal information and communication governance throughout the ecosystem. •

READY OR NOT: STANDARD SETTERS AND POLICY MAKERS

Now more than ever, standard setters and policy makers have a vital role to play in establishing clear enforceable boundaries within the business reporting ecosystems, as well as stimulating economic and positive societal change while preventing ecosystem failures. Business regulations and the associated reporting processes are the plinth, enabling government economic oversight, social policy setting, and taxation administration. The practical and operational challenges in innovating the data systems and tools within government bodies and the statutory frameworks to achieve new optimized outcomes will require a data revolution.

[9] European Commission, 2012.

A Path to a **Data Revolution**

Achieving RegTech and SupTech for the new Digital Age requires cross-stakeholder collaboration to establish and align on a transformed ecosystem.

The effectiveness of RegData is directly dependent on a regulated entity's ability to connect people, processes, and technologies to produce the desired outcomes that meet the new industrial age needs. At the heart of this transformation is the need for both a Global Intelligent Taxonomy Registry (GITaR) and a Collaborative Open Taxonomy Innovation Platform (CoTIP) capturing all financial, nonfinancial, performance, EER, and compliance information in machine-readable data formats.

Establishing a common approach for exchanging and reusing RegData across the ecosystem would be a major step toward achieving lower compliance costs and reducing risks. This will realistically only be possible via a collaborative multi-stakeholder solution.

The question remains: What path should we take?

A railcar has little value until the rails are laid. Digital transformation also requires two basic elements before this train can leave the station: a GITaR and a CoTIP.

The global nature of this solution would ensure that information could not result in different knowledge simply because of the choice of software application. An effective global taxonomy ecosystem rests on building several core components (see Figure 4).

The GITaR is a collection of data elements (a library of taxonomies, not reported information) for critical financial, nonfinancial, and other emerging forms of external reporting to regulatory authorities, with unambiguous, consistent, and objective data definitions. It is based on consistent and aligned data-flow standards throughout business and global compliance ecosystems and may be reported by regulated business entities to multiple regulated bodies or third parties.

These data elements are classified and defined based on a predefined structure and aligned with requirements across multiple regulators (through an agnostic data creation and sharing mechanism).

> "I have a dream for the Web [in which computers] become capable of analyzing all the data on the Web—the content, links, and transactions between people and computers."
> —Tim Berners-Lee

The CoTIP is a space to create, collate, and share taxonomies in an industry-wide common central repository. The platform would help market registrants to consistently use the right taxonomy and to harmonize data definitions to enable enhanced efficient exchange of electronic machine-readable RegData across all the stakeholders in the compliance ecosystems.

A GITaR, which would include a Structured Data Taxonomy Accredited Registry, and a CoTIP for public good would allow stakeholders to actively verify that they are using the right taxonomy to enable enhanced, unambiguous exchanges of electronic machine-readable data to multiple regulatory authorities.

This vision is based on automating and sharing metadata terms across Internet of Things (IoT) applications. The declaration of schemas in metadata registries advances this vision by

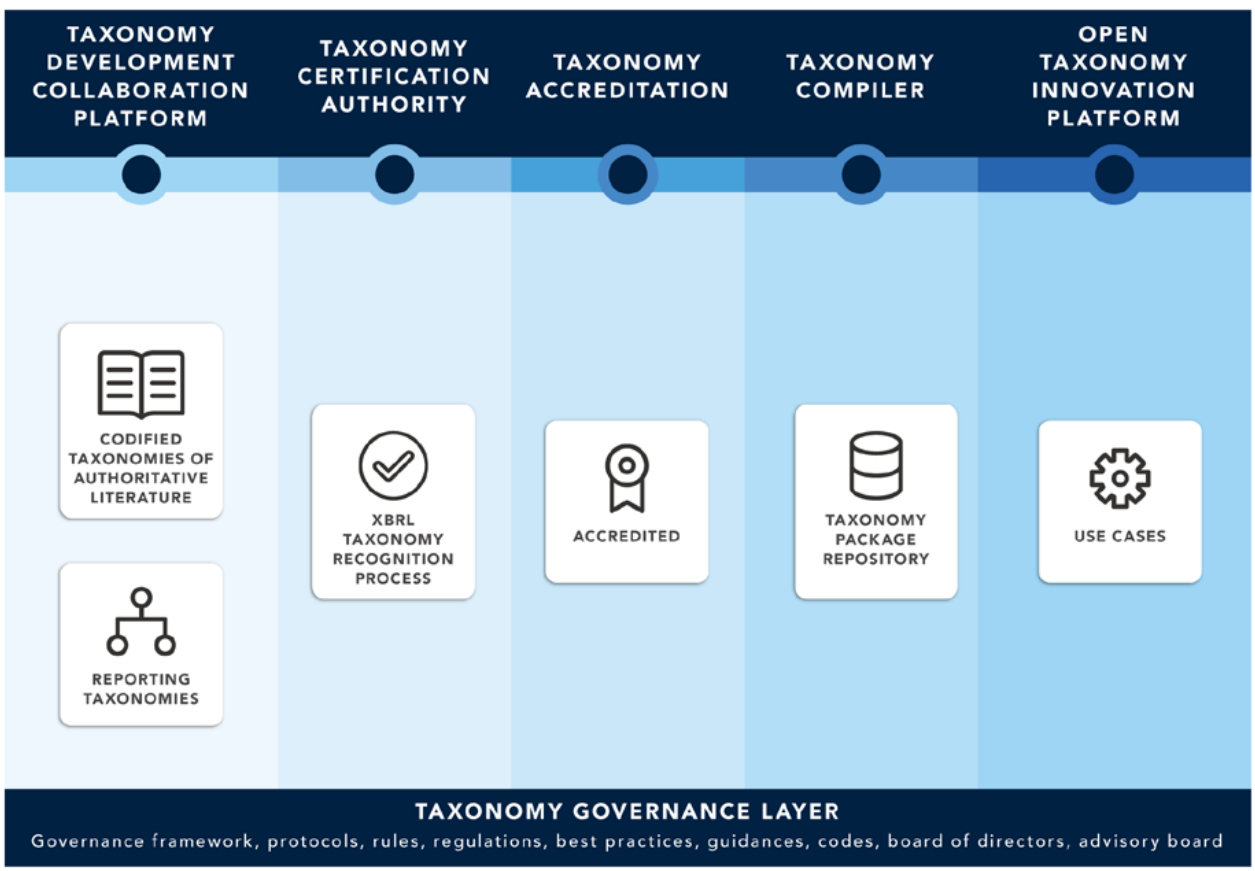
providing a common approach for the disovery, understanding, and exchange of semantics. Yet many registry issues remain unclear, and ideas vary regarding their scope and purpose. We believe the focus is clear: a GITaR and a CoTIP are needed to tackle critical financial, ESG (environmental, social, and governance), nonfinancial, and other emerging forms of external reporting.

The GITaR and CoTIP provide mechanisms to collaborate and create shared context. Regulators, multilateral organizations, educators, social groups, software developers, and companies (or preparers) could all benefit in the following ways:

Regulators could use intelligent digital taxonomy registries to compare one regulator's filing quality with other regulators (e.g., ESMA and JFSA) in terms of transparency as well as leading and lagging indicators by jurisdiction, which would enable faster identification of gaps. Sharing gaps and opportunities with lawmakers could allow for more adaptive, real-time lawmaking in ESG matters, both on a regulatory and legislative basis. Regulators could also access this global knowledge to identify gaps in existing legislation, irrespective of comparative findings.

Multilateral organizations could use the intelligent taxonomy digital registries to identify best-in-class policies, encourage transparency, and identify leading and lagging indicators by jurisdiction, enabling opportunities or gaps to be identified more efficiently and effectively. This could allow collaboration with other multilateral organizations or public stakeholder bodies to develop adaptive and real-time integrated policies or new laws or amendments in matters of mutual interest. Public sector stakeholders could also access this global knowledge to identify gaps in legislation.

FIGURE 4: COMPONENTS OF A GLOBAL TAXONOMY ECOSYSTEM



Educators could use intelligent digital registries to identify areas of research on ESG topical areas, gaps, or needs as well as using the registry and innovation lab to conduct aspects of the research itself.

Social groups could use the intelligent digital registry library to understand the standards in place. From there, they could then independently analyze and understand reporting entities as part of their efforts to promote social change. Consider how an environmental group could use this intelligent digital registry library to identify new ESG topical areas needing their focus to raise public awareness and promote positive social change.

Software developers could use the digitally intelligent registries and accredited taxonomies to underpin application programming interfaces or software as a service (SaaS) development to provide the latest and greatest tools for reporting and filing submissions. Solutions could allow SaaS customers to benchmark themselves against best practices or alternative practices around the world. It could also lead to voluntary disclosure improvements, which could prompt regulatory changes.

Companies or preparers could identify and implement best practices in a cost-effective and efficient manner by:

- Sharing key terms and definitions for environmental and social issues within a sector so that their reporting and auditing frameworks align.
- Working with stakeholders to address challenges associated with AI and to coin language to make AI more inclusive and accessible.
- Sharing best practices for how to re-skill workers whose jobs are displaced or eliminated through automation.
- Creating consistent metrics for reporting on carbon emissions. For example, some airlines currently report carbon emissions per flight, while others report emissions per passenger or by revenue.
- Using input for the countries, markets, and sectors in which an entity operates to identify common approaches and partners once smart automation is added. •

A Strong Commitment and **Executive Leadership from Stakeholders**

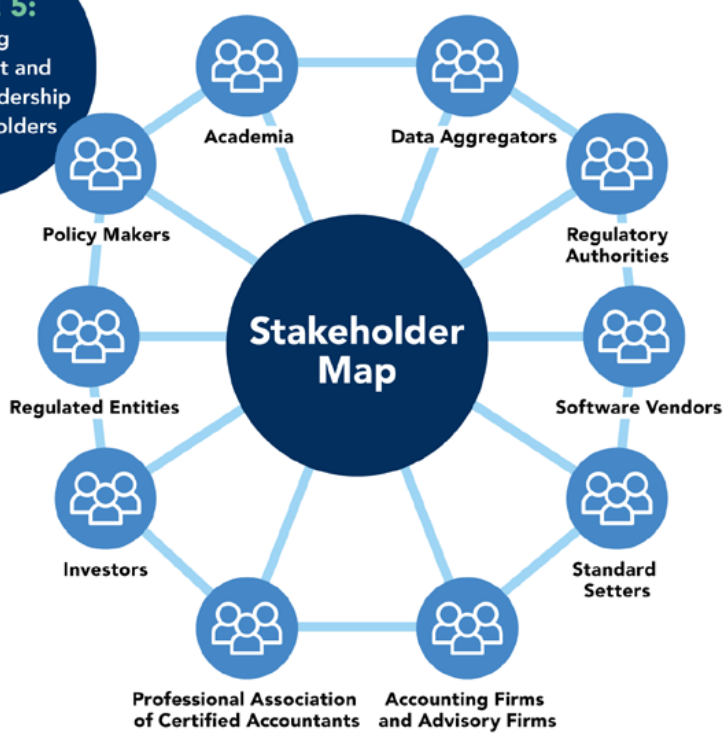
Change on the scale required for the Fourth Industrial Revolution requires strong executive leadership and support from all stakeholders to achieve development of a global reporting framework. The key stakeholders are shown in Figure 5.

A global reporting framework provides regulatory authorities and regulated entities with an unequivocal, cost-effective, secure, and adaptable method for the exchange of machine-readable business information between regulated entities and regulatory authorities. This centralized platform for digital regulatory reporting across an ecosystem provides end-to-end benefits while still managing the need for local, state, federal, and other reporting. (For example, several U.S. states collect local government financial statistics, as compilations of this data at the local level may lack the timeliness and consistency of audited RegData reports.) Validation automation in RegData is the second area of efficiency gain where software programs can take advantage of information filed in XBRL format to validate information and detect fraud faster.

As regulations and oversight expand but reporting timelines shrink, digitization of the reporting supply chain is a necessity. To accomplish their missions, regulatory oversight authorities need reliable, consistent, and accurate RegData from the regulated entities they supervise. Taxonomies accredited by the GITaR exist to ensure harmonization of data definitions in the library of reporting frameworks. Efficiency in gathering business and financial information using XBRL/SDMX can be achieved by having regulated entities create one report to meet multiple regulatory requirements from multiple government agencies.

Taxonomy development models the meaning of business information in a form comprehendible by computer applications (i.e., a formal description of concepts, terms, and relationships within a given knowledge domain) and takes strong commitment from leadership in both the public and private sectors. •

FIGURE 5: A Strong Commitment and Executive Leadership from Stakeholders



Call to **Action**

Global market participants can realize financial and nonmonetary benefits by furthering the goal of building reporting systems that bring the right information from its source within an individual organization seamlessly to investors, regulators, policy makers, and other users. Each stakeholder along this information chain can further this digital transformation by:

- Establishing a stakeholder task force committed to the digital transformation of regulatory reporting.
- Ensuring standard setters, framework developers, and best practices are committed to the repository as the authority of digital taxonomies for industry bodies of knowledge around reporting and compliance.
- Preparing a high-level solution blueprint for implementing a global digital framework within products. Using a high-level understanding of the regulatory ecosystem and its scope with a view to assessing the value that digital transformation programs provide to both policy makers and regulatory authorities.
- Ensuring software vendors and service providers develop a prototype implementation to test mapping and lodgment of the reporting requirements. •

CONCLUSION

Data is the lifeblood for regulated entities, standard setters, policy makers, investors, and other stakeholders. The quality of the raw material is key to the credibility and sustainability of our profession. Without high-quality, timely, and machine-readable data, we cannot know how much carbon a company pollutes, how much natural capital a country has available for economic development, what companies are trading, and whether demand for a product is expanding or being disrupted.

The overall condition of data assets is directly dependent on a company's ability to connect people, processes, lines of business, and technologies. It requires that all of these things work together to produce the desired outcomes that make data fit for its intended purpose.

In this increasingly complex world, regulated entities are increasingly integrated and affected by the regulatory environment and vice versa. The leaders of tomorrow will be those who understand data and the impact of the information quicker, acting upon it in the most efficient way, using all tools, techniques, and processes available in this new industrial age. Leaders will need to establish an entity-wide integrated sustainable business strategy and adopt a single set of integrated controls and compliance monitoring mechanisms that satisfy regulators, auditors, and the business operation. They will be inspiring enablers of the digital transformation, rather than taskmasters, and will help their organizations to manage internal and external variables with agility and dynamism.

The audit profession is undergoing an unprecedented level of public scrutiny. Data governance initiatives can be driven by the need to improve data quality. With new regulatory requirements for enhanced statutory audit reports, no entity wants to risk weak data governance being the cause for a Key Audit Matter (KAM), as set out in International Standard on Auditing 701.[10] For competitive economies, the true benefits will be realized only by cross-government initiatives addressing multiple stakeholders—in other words, providing leadership.

> The accounting and compliance professionals who master the critical data in internal and external reports that drive the business will be invaluable in the Fourth Industrial Revolution.

Digital transformation in the Fourth Industrial Revolution is not a new term, but its impact is being felt across industries in an unprecedented manner. It is, therefore, not surprising that business reporting, accounting, and auditing are the next lines that must adapt to the digital data revolution. Accounting and compliance professionals are uniquely poised to take advantage of this digital transformation—possibly more so than any other profession. •

For more information, please visit imanet.org/thought_leadership.

[10] International Auditing and Assurance Standards Board, *Determining and Communicating Key Audit Matters*, July 6, 2016, www.iaasb.org/publications/determining-and-communicating-key-audit-matters-4.

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