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Environment, Health & Safety

Green Quadrant: EHS Software 2023

By Chris Sayers
With Bill Pennington

January 2023

This version of the report contains Verdantix's summary of SAI360's offerings to help prospective customers evaluate whether the vendor is a good fit for their requirements. It does not contain other vendor profiles.

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This report provides a detailed fact-based comparison of the 23 most prominent environment, health and safety (EHS) platform vendors. Based on the proprietary Verdantix Green Quadrant methodology, our analysis encompassed 2.5-hour live product demonstrations with pre-set scenarios and vendor responses to a 353-point questionnaire covering seven technical, 19 functional and 11 market momentum categories. Verdantix also conducted interviews with more than 15 software users and reviewed the data from our global survey of 302 EHS decision-makers.
The EHS software market has, and is currently, undergoing a consolidation driven by rampant private equity interest, due to continued market growth and an expanding market opportunity within the adjacent ESG and sustainability management areas. Among the vendors featured in the Leaders' Quadrant, seven firms – Benchmark ESG, Cority, Enablon, Intelex, SAI360, Sphera and VelocityEHS – offered robust all-round EHS management capabilities.

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Organizations mentioned

3E (formerly Verisk 3E), AIHA, Airsweb, Alcumus, Allergen, ALMEGO, AMCS,
American Conference of Governmental Industrial Hygienists (ACGIH),
American National Standards Institute (ANSI), Anglo American, Apax Partners, Arcadia, Augmentir, Auvaro, Avetta,
Axion Health, Bank of New Zealand (BNZ), Banyard Solutions, Barrick Gold, BDO, Benchmark ESG, Biome, BJF Group,
Black & Veatch, Blackstone, BLR, BlueKanGo, Blue Ocean Brain, BOMcheck, Bosch, Briscoe Group, BROWZ,
Bureau Veritas Laboratories, Carlyle Group, Cayuga Health System, CDP (Carbon Disclosure Project),
CenterPoint Energy, CGE Risk, Chemical Watch, Chymeia, Cisco, Cognibox, Colgate-Palmolive,
Colorado Bureau of Investigation, ComplianceQuest, CompliSpace, Continental, ContractorCheck, ConvergentIS,
Core Analytics, Cority, Cornerstone Building Brands, CVC Growth Partners, Dakota Software, Damstra, Datamaran,
DevonWay, DMK Group, DNV, Donesafe, Dubai Natural Gas, Duke Energy, Dussmann Group, eCompliance, EcoOnline,
ecoPortal, EcoVadis, EDF Energy, ehsAI, ej4, Elisa, Elisa IndustrIQ, Elite Management SST, EMEX, EMSL Analytical,
Enablon, Engage EHS, Engica, Enhesa, Enterprise Health, Enviance, Environment Essentials,
Environmental Protection Agency (EPA), Envizi, ERM, ETQ, eVision, Evotix (formerly SHE Software), ExxonMobil, F19,
Food and Drug Administration (FDA), Foodstuffs, Forestry Industry Safety Council (FISC), Fortive Corporation, Fortune,
Frog Capital, Future Energy Ventures, Genstar Capital, GHG Protocol,
Global Real Estate Sustainability Benchmark (GRESB), Global Reporting Initiative (GRI), GOARC, Goldman Sachs,
Goodyear Rubber and Tire Company, Guardhat, HAECO Group, Hg Capital, HSI, Huddle, IBM, Ideagen, IEC,
IFS Ultimo, Imatis, Industrial Scientific, INEOS, Inflexion, Insight Partners, Intelex, Intellect, Intenseye, Interaptix,
International Automotive Task Force (IATF), International Organization for Standardization (ISO), Intertek Group,
INX Software, IPC, iScout, IsoMetrix, j5 International, John Deere, Johnson & Johnson, Johnson Controls Inc.,
J.P. Morgan, Kinetica Labs, KMI, Kopin, KPA, Las Vegas Valley Water District, Libryo, Lisam Systems,
Los Alamos National Laboratory, Lowe's, Mango, Martech Media, McDonald's, Meercat, Method Park, Metric,
Mi-Co, Microsoft, Morgan Stanley, MSDSonline, Müller, Multimedia Training Systems (MTS), Multiplex, Munio,
MyAbilities, National Institute for Occupational Safety and Health (NIOSH), National Response Center (NRC),
Natural Power, Nebraska Public Power District, New Mountain Capital, NHS, Nobilia, Noggin, Nordic Port,
North Carolina State University, Notion Capital, Occupational Safety and Health Administration (OSHA),
Office of the Chief Medical Examiner, OneLook Systems, One Peak Partners, OpsBase, Optima, Origami Risk,
Ørsted, OSHENS, OSIsoft, Pacific Northwest National Laboratory, Partners Group, PEC Safety, Perillon, Petrotechnics,
Pilotech, PleaseTech, Polypipe, Praedicat, Predictive Solutions, Privacy Shield, Process Data Control (PDC) Corp,
ProcessMAP, Prometheus Group, Protex AI, Proxxi, Qlik, Qualcomm, Quality Carriers, Qualsys, Qualtrax, Quentic,
RAP International, RealWear, Red-on-line, RegScan, Reporting 21, riskmethods, RJ Lee Group, Rombit,
SafeTec Compliance Systems (SafeTec), SafetySkills, SafetyTek, SAI360, Sandvik, SAP, Saudi Aramco,
Scannell Solutions, Schnellecke, Scholz, Securities and Exchange Commission (SEC), SGS, Shell,
Simple But Needed (SBN) Software, Simple Compliance, SiteHawk, Sitepass, Skillsoft, Snowflake, Solv Solutions,
SOS Intl, Specsavers, Spectrum Equity, Sphera, Spirit AeroSystems, StarTex, StaySafe,
Stellantis (formerly Fiat Chrysler Automobiles), StoryShare, STP, Strattam Capital, StrongArm Technologies,
Summa Equity, SustainAbility, Sustainability Accounting Standards Board (SASB), Tableau, Tanarra Credit Partners,
Task Force on Climate-Related Financial Disclosures (TCFD), Telstra, TenForce, Teradyne, TerraPower,
The Warehouse Group, thinkstep, Thoma Bravo, TIKS Solutions, TotalEnergies, ToxPlanet, UL, Unilever, Urjanet,
US Bureau of Labor Statistics, US Department of Energy, Vado, Vector Solutions, VelocityEHS, Veriforce, VisiumKMS,
Walmart, Waud Capital Partners, WeSustain, WhatsApp, Winvic, Wolters Kluwer, Workrite, World Economic Forum,
Xybion, Yarra Valley Water, Yokogawa, Zebra Technologies, Zoom.

The State Of The EHS Software Market

Over the past two years, the market landscape for EHS software has undergone a paradigm shift, as EHS providers have expanded their product offerings to meet the ravenous appetite for robust environmental management solutions brought on by the ESG megatrend. This has raised the profile of EHS functions within organizations, with many vendors serving the interlinking needs of EHS, quality, operations, product stewardship, and ESG and sustainability functions. In addition, product innovation centred on advancements in AI, machine learning (ML) and the Internet of Things (IoT) is redefining the functional possibilities of EHS software (see Verdantix Strategic Focus: Improving Health And Safety With AI). As the market reaches maturity, providers are turning to emerging technologies as a point of differentiation, resulting in a series of benefits for users, namely time savings, data quality improvements and increased EHS data streams (see Verdantix Tech Roadmap EHS Technologies 2022).

Verdantix tracks over 300 active EHS software providers available on the market. Vendors range from broad management systems with a global customer base, to specialist firms with deep expertise in a select group of functional categories, or which cater to specific industry verticals. Given the EHS software market landscape complexity, breadth and pace of change, this report provides individuals who are responsible for selecting, implementing and deriving value from EHS software applications with a detailed assessment of the 23 most prominent platform solution providers and their product offerings. The customer questions answered by this report include:

- What is the current state of the EHS software market?
- Which EHS software applications lead the market?
- Which EHS software applications will best match the requirements of my firm?
- How can I benchmark the capabilities of EHS software applications?
- What factors indicate that an EHS software vendor is a reliable partner for the future?

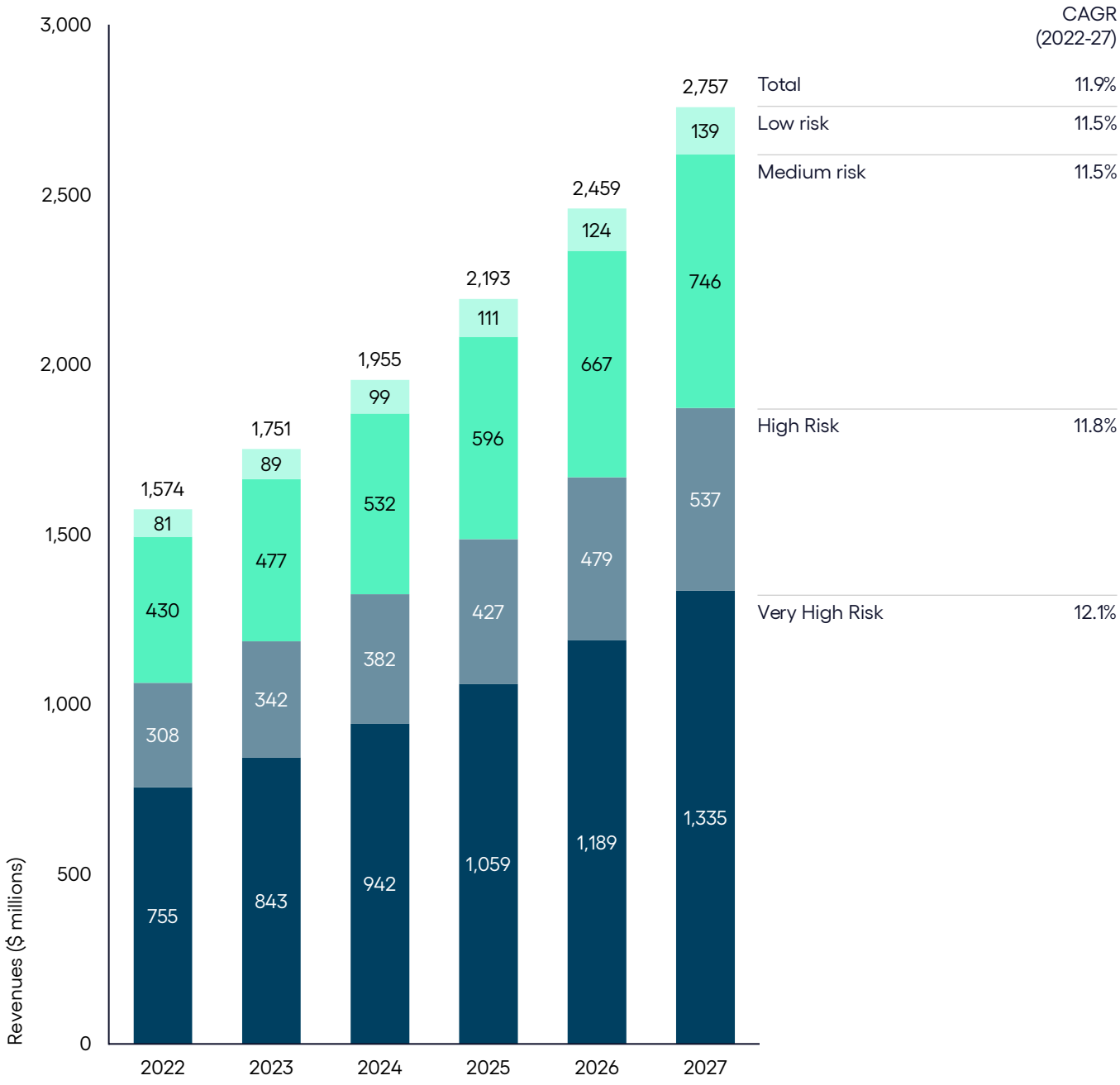
To answer these questions, Verdantix assessed 23 suppliers using a 353-point questionnaire, two-and-a-half-hour live demonstrations by suppliers, and interviews with existing EHS software customers. The resulting analysis is based on the proprietary Verdantix Green Quadrant methodology, which is designed to provide an evidence-based, objective assessment of vendors offering comparable products or services.

The EHS Software Market Landscape Is Primed For Consolidation

Spend on the EHS software market will reach $1.6 billion in 2022 and grow at a CAGR of 11.9% to $2.7 billion in 2027 (see **Figure 1**) (see Verdantix Market Size And Forecast: EHS Software 2022 - 2027 (Global)). Reliable growth in the face of huge economic strain, COVID-19 disruption and increasing pressure to gain a foothold in the ESG and sustainability software battleground for high-risk industry segments has bolstered investor interest, altering the vendor landscape.

Figure 1

EHS Software Market Forecast By Industry Risk Category 2022-2027



Source: Verdantix Market Size And Forecast: EHS Software 2022-2027 (Global)

Interest From Investors Is Ramping Up As Demand For EHS Solutions Reaches New Heights

The primary accelerators for EHS software market growth over the next five years are a broader addressable market due to ESG functionality expansion, advancing customer maturity as organizations pursue proactive risk management strategies, and consolidation plans among large enterprises, leading to inflated software licences. Healthy growth has fuelled competition, resulting in more than 50 instances of EHS software-linked acquisitions, investments and asset sales during 2021 and 2022 – a notable increase from historical market activity. Following analysis of market dynamics, Verdantix finds that:

- **Smaller, specialist providers in EHS and adjacent markets are prime acquisition targets.**
  Analysis of EHS software-linked transactions reveals a high number of strategic acquisitions of specialist firms aimed at broadening and deepening existing functionality. Although providers are acquiring software across several areas, trends do emerge. Firstly, specialist e-learning and training providers are hot prospects for acquisition (see **Figure 2** and **Figure 3**). Since the start of 2021 Cognibox, EcoOnline, Evotix and HSI have all acquired firms in this space. There have also been notable movements within mobility-focused acquisitions (KPA's acquisition of iScout and EcoOnline's acquisition of Engage EHS are both mobile-focused safety management offerings). Moreover, Ideagen acquired a low- and no-code mobile app development firm Mi-Co. Due to high demand and complex in-house development, Verdantix anticipates further acquisitions within areas such as contractor management, ESG (Scope 3), supply chain management and environmental management.

- **Adjacent EHS regulatory content market has been highly active.**
  There has been heightened activity amongst EHS content providers – firms that consolidate regulatory content for EHS workflows, such as chemicals hazard and toxicology data, legal registers, audit programmes, audit checklists, audit protocols and environmental frameworks, and which often directly integrate with EHS software. Among content firms, Enhesa has acquired both ToxPlanet and RegScan; Libryo received investment in May 2021; and 3E was acquired for $950 million. However, there have been further examples of EHS software firms acquiring their own regulatory content specialists. Consider Ideagen's acquisition of CompliSpace for £58 million ($66 million) in November. As country-specific regulations expand, regulations generally become more stringent and the complexity of the ESG landscape grows, Verdantix expects further investment to increase EHS compliance transparency.

- **With PE backing, larger players consolidate, to broaden offerings and expand regionally.**
  Alongside acquiring specialist firms, larger, private-equity-backed EHS software providers have their eyes set on acquiring broader platforms with complementary offerings. There have been several notable moves. Firstly, in a deal orchestrated by Hg Capital, Ideagen acquired ProcessMAP in October 2022. The acquisition will improve Ideagen's geographic reach, bolster its core EHS offering and prime the firm for an ESG software rollout. Similarly, in a deal facilitated by Apax Partners, EcoOnline acquired Alcumus in January 2023. Whilst Verdantix does not view an EHS roll-up strategy as the path towards maximizing shareholder value creation, the given examples bolster existing offerings whilst adding deep functionality in new areas. Going forward, we anticipate more transactions that will start to consolidate some of the players featured in this benchmarking.

- **PE firms Apax Funds, Hg Capital and Partners Group are highly active in the market.**
  Whilst there has been sustained private equity (PE) interest in EHS software for some time, the past two years have seen PE capital injection ramp up. Headline deals include Hg Capital acquiring Ideagen for £1.05 billion ($1.30 billion) in June 2022; Partners Group acquiring a significant minority stake in VelocityEHS in August 2022; Apax Funds acquiring Alcumus in February 2022; and Blackstone acquiring Sphera for $1.4 billion in July 2021. Reliable EHS software market growth and addressable market expansion via adjacent operational risk management (ORM) and ESG markets will likely lead to further investment, despite a technology bear market.

Figure 2

EHS Software Market Transactions 2019-2020

2019	Transaction	Description
Jan	ACQUISITION	Ideagen acquires Scannell Solutions for £3.5 million ($4.5 million)
Jan	ACQUISITION	ERM acquires SustainAbility (circa 80 employees)
Jan	ACQUISITION	Sphera acquires Petrotechnics
Jan	ACQUISITION	Hexagon acquires j5 International
Feb	ASSET SALE	Verisk 3E buys SAP's EHS regulatory content business
Feb	ACQUISITION	Avetta acquires BROWZ
April	BUY OUT	Tanarra Credit Partners buys out INX Software
May	ACQUISITION	Sphera acquires SiteHawk
May	INVESTMENT	One Peak Partners & Morgan Stanley Expansion Capital invest in Quentic
May	BUY OUT	Thoma Bravo buys out Cority
May	ACQUISITION	Veriforce acquires PEC Safety
May	ACQUISITION	Genstar Capital acquires Prometheus Group
June	ACQUISITION	Fortive acquires Intelex
June	ACQUISITION	Lisam Systems acquires Perillon
July	ACQUISITION	Sphera acquires thinkstep
July	ACQUISITION	Alcumus acquires eCompliance
July	INVESTMENT	Teradyne, J.P. Morgan, Qualcomm & Kopin invest in RealWear
Aug	ACQUISITION	EcoOnline acquires Nordic Port
Aug	BUY OUT	Carlyle Africa Fund buys out IsoMetrix
Sep	ACQUISITION	Yokogawa acquires RAP International
Oct	ACQUISITION	Ideagen acquires Optima
Oct	ACQUISITION	Cority acquires Axion Health
Oct	ACQUISITION	Prometheus Group acquires Engica
Dec	ACQUISITION	VelocityEHS acquires Meercat
Dec	ACQUISITION	Health & Safety Institute (HSI) acquires Martech Media

Figure 2 (continued) ↓

Figure 2 (continued)

2020	Transaction	Description
Jan	INVESTMENT	CVC Growth Partners invests $200 million in EcoVadis
Jan	ACQUISITION	Wolters Kluwer acquires CGE Risk Management Solutions
Jan	ACQUISITION	Cority acquires Enviance
Feb	ACQUISITION	HSI acquires Donesafe
Feb	INVESTMENT	Frog Capital invests $9 million in SHE Software
Feb	INVESTMENT	Summa Equity and Goldmann Sachs Merchant Banking Division invest in EcoOnline
Mar	ACQUISITION	Ideagen acquires Workrite for £6.8 million ($7.9 million)
Mar	INVESTMENT	The Carlyle Group invests over $6 million in IsoMetrix
April	ACQUISITION	KPA acquires Multimedia Training Systems (MTS)
July	ACQUISITION	Alcumus acquires Banyard Solutions and ContractorCheck
Aug	ACQUISITION	Ideagen acquires Qualsys for £15.6 million ($20.3 million)
Aug	ACQUISITION	EcoOnline acquires Airsweb, an EHS software provider
Oct	ACQUISITION	HSI acquires training provider SOS Intl
Nov	ACQUISITION	HSI acquires e-learning firm Vado
Nov	ACQUISITION	Intelex acquires ehsAI, a compliance automation technology provider
Dec	ACQUISITION	Enhesa acquires Chemical Watch, a chemicals compliance provider
Dec	INVESTMENT	Ideagen raises £49 million ($64 million) from new and existing investors

Source: Verdantix analysis

Figure 3

EHS Software Market Transactions 2021-2022

2021	Transaction	Description
Jan	ACQUISITION	KPA acquires iScout, an EHS software provider for SMEs
Jan	ACQUISITION	Health & Safety Institute (HSI) acquires e-learning provider ej4
Jan	ACQUISITION	EcoOnline acquires Engage EHS, a health and safety software provider
Feb	ACQUISITION	Ideagen acquires Huddle, a compliance software provider
Mar	ACQUISITION	Ideagen acquires Qualtrax, a compliance management software provider
Apr	ACQUISITION	Cority acquires WeSustain, an ESG software provider
May	INVESTMENT	Future Energy Ventures invests £1.35 million ($1.9 million) in Libryo
May	ACQUISITION	VelocityEHS acquires OneLook Systems, a permit to work provider
May	ACQUISITION	Intertek acquires the SAI Global Assurance division
Jun	ACQUISITION	DNV acquires Imatis, a digital health firm
Jul	ACQUISITION	EcoOnline acquires Chymeia, a chemicals management provider
Jul	ACQUISITION	Blackstone acquires Sphera for $1.4 billion
Jul	ACQUISITION	EcoOnline acquires Pilotech, a crisis management solutions provider
Jul	ACQUISITION	SHE Software acquires StoryShare, a micro-learning solutions provider
Jul	ACQUISITION	VelocityEHS acquires Kinetica Labs, a simulation technology provider
Jul	ACQUISITION	Ideagen acquires OpsBase, a health and safety compliance platform
Jul	ACQUISITION	Ideagen acquires Mi-Co, a low- and no-code mobile app developer
Jul	ACQUISITION	UL Solutions acquires Method Park, a software solutions and engineering firm
Jul	ACQUISITION	HSI acquires Solv Solutions, an injury management solutions provider
Aug	ACQUISITION	Alcumus acquires Mango, a quality management and compliance provider
Sep	INVESTMENT	Tenforce becomes part of the Elisa IndustrIQ solution, following a strategic investment
Sep	ACQUISITION	Alcumus acquires Simple Compliance
Sep	INVESTMENT	Intenseye raises $25 million in Series A funding led by Insight Partners
Sep	ACQUISITION	Damstra acquires TIKS Solutions, a workplace safety firm
Sep	ACQUISITION	INX Software acquires Sitepass, a contractor management firm
Nov	ACQUISITION	Ideagen acquires CompliSpace
Nov	ACQUISITION	HSI acquires Blue Ocean Brain, a learning solutions provider
Nov	ACQUISITION	Tenforce acquires Process Data Control (PDC) Corp, a process improvement services firm
Dec	ACQUISITION	EcoOnline acquires Munio, an EHS e-learning solutions provider
Dec	ACQUISITION	Cognibox acquires Elite Management SST, a training firm
Dec	INVESTMENT	Ideagen raises £103.5 million ($134.6 million) through placement of ordinary shares

Figure 3 (continued) ↓

Figure 3 (continued)

2022	Transaction	Description
Jan	ACQUISITION	New Mountain Capital acquires Verisk 3E (now 3E) for $950 million
Feb	ACQUISITION	Apax Partners acquires Alcumus following the stake sale of investor Inflexion
Feb	ACQUISITION	Hexagon acquires ETQ, an EHSQ software provider
Mar	ACQUISITION	EcoOnline acquires Biome, a SaaS environmental management software firm
Mar	INVESTMENT	Intellect receives a majority growth investment from Strattam Capital
Mar	ASSET SALE	VelocityEHS acquires two software solutions from MyAbilities
May	ACQUISITION	AMCS, a global integrated software provider, acquires Quentic
May	ACQUISITION	Arcadia, an information technology firm, acquires Urjanet, a utility data provider
May	INVESTMENT	Inflexion makes a minority investment in Alcumus
Jun	ACQUISITION	EcoOnline acquires StaySafe, a cloud-based lone worker safety solutions firm
Jun	ACQUISITION	Enhesa acquires ToxPlanet, a chemical safety solutions provider
Jun	ACQUISITION	Hg acquires Ideagen for £1.05 billion ($1.28 billion)
Jul	ACQUISITION	Alcumus acquires Cognibox, a contractor management solutions provider
Jul	ACQUISITION	Enhesa acquires RegScan, a regulatory and sustainability intelligence content provider
Aug	INVESTMENT	Partners Group acquires a significant minority stake in VelocityEHS
Aug	INVESTMENT	Protex AI raises $18 million in seed and Series A funding led by Notion Capital
Sep	ACQUISITION	Sphera acquires riskmethods, a supply chain risk management software provider
Sep	ACQUISITION	Cority acquires Reporting 21, a sustainability-focused SaaS platform and consultancy
Oct	ACQUISITION	Ideagen, an EHSQ and GRC platform, acquires ProcessMAP
Oct	ACQUISITION	HSI acquires SafetySkills, an e-learning provider
Oct	ACQUISITION	DNV acquires Auvaro, an information security assurance firm
Dec	ACQUISITION	ERM acquires Libryo, a global cloud-based EHS regulatory intelligence platform

Source: Verdantix analysis

Expansion Into ESG And Sustainability Is The Defining Market Trend Over The Past Two Years

Verdantix analysis finds that there have been unprecedented levels of interest from PE investors in EHS software over the past two years. The widespread acquisition of best-of-breed providers to broaden and deepen functional offerings has instigated a market consolidation, with a number of 2023 Green Quadrant participating vendors merging into a single entity. Whilst acquisitions generally result in more complete products and larger geographic footprints, buyers and investors should be cognizant of the pitfalls of this buy-and-build approach (see Verdantix Market Insight: 5 Key Considerations When Buying EHS Software). Based on our analysis of market news and vendor strategies, we find that the:

- **Degree of product commoditization varies massively by module type.**
  Having been established for 20-plus years, EHS software is a mature market segment. However, across the EHS landscape of modules, the level of commoditization varies significantly. Core areas of competency such as safety management, incident workflows, and audits and inspections, are highly standardized across vendors, with little meaningful variation (see **Figure 4**). Modules with high levels of differentiation are those with niche use cases that occupy a smaller segment of the total EHS software market size. Functional areas in this category include industrial hygiene (IH) and ergonomics. Other modules with high differentiation are topics that bleed outside of core EHS competencies, such as quality, control of work, ESG and sustainability, and GHG emissions, particularly Scope 3.

- **Expansion into ESG functionality has become a strategic priority.**
  The growth of ESG and sustainability has defined many EHS software providers' functional development, brand positioning and strategic planning. The past 24 months have seen a tsunami of ESG-aligned product releases, acquisitions and partnerships, driven by huge revenue potentials. Significant plays in this space are Cority's sustainability cloud solution launch and acquisitions of WeSustain and Reporting 21; IsoMetrix's internally developed ESG application Lumina; Intelex's partnership with Datamaran to provide dynamic materiality assessments; and Sphera's acquisitions of thinkstep and riskmethods, expanding its ESG product portfolio into supply chain risk management. Firms are shifting their entire brand positioning, with some bucketing EHS within the scope of ESG.

- **Operational risk management (ORM) is a natural growth area for EHS vendors.**
  Select EHS software firms have expanded their existing risk capabilities into operations and process safety elements through strategic acquisitions (see Verdantix Green Quadrant: Process Safety Management 2021). Prominent deals within the EHS space are Sphera's acquisition of Petrotechnics in 2019 and Enablon's acquisition of CGE Risk in 2020. More recently, VelocityEHS acquired OneLook Systems in May 2021, bolstering its control of work offering. The reverse is true for ORM vendors integrating aspects of EHS. For example, GOARC, primarily an Industry 4.0 platform vendor, has combined various EHS-focused features into its connected worker offering; and IFS Ultimo, an enterprise asset management (EAM) software firm, has an EHS solution spanning incident management, management of change, permits and other modules. The past few years have seen the homogenization of functionality across EHS and process safety, allowing customers to realize synergistic benefits and improve cross-functional communication.

- **Firms are closely reviewing partnership strategies to add maximum value.**
  Throughout our analysis of vendors' business strategies, the better leveraging of partnerships consistently emerged as a strategic priority. There are roughly four partnership types: consulting and implementation; EHS content and software; hardware and Internet of Things (IoT); and software development. Firms intent on expanding their geographic reach and increasing new customer wins are pursuing a globally distributed set of implementation partners (see Verdantix Green Quadrant 2022: Digital EHS Technology Implementation Services). Our analysis found that some organizations have more than 30 established implementation partners. Aside from implementation, firms are leveraging software integrations to provide customers with

access to best-of-breed solutions. For instance, Intelex has an exclusive reseller agreement with Datamaran for materiality assessments; Cority and Benchmark ESG partner with Interaptix for industrial safety; Cority also partners with F19 to produce interactive web-based reporting for stakeholders; and Evotix partners with Metric for ESG workflows.

Figure 4

EHS Functional Capabilities: Differentiation In The Market

EHS Module	Market Standard	Differentiators
Quality mgmt	Use of configurable workflows and contractor mgmt capabilities to fulfil basic quality mgmt needs Provision of an asset inventory	Dedicated quality mgmt functionality or modules Preventative maintenance and manufacturing mgmt solutions
Air and GHG emissions	Support for permit mgmt, but lacks a calculation engine to support large-scale emissions calculations Scope 1, 2 and 3 emissions supported through manual data entry and formula builders with either in-house or customer-supplied emissions factors	Smart features to track permit compliance, including hard and soft limits against applicable regulations Support for category 1-15 Scope 3 emissions and use of a supplier portal Emissions factors from multiple sources and an in-house library
Industrial hygiene	Use of configurations to enter and calculate sampling data Use of APIs to interface with laboratories Able to define similar exposure groups (SEGs)	Able to link sample data to SEGs Numerous out-of-the-box (OOTB) lab integrations and the use of a lab portal Advanced calculations and provision of AIHA statistical tool set
ESG & sustainability	Configurations to support ESG frameworks Can set targets and define KPIs using a formula builder Support stakeholder mgmt	OOTB TCFD framework and certified for CDP, GRI and SASB Scenario planning, carbon credits mgmt and plausibility checks
Ergonomics	Configure ergonomic assessments and dashboards Some OOTB ergonomic assessments	Broad range of OOTB ergonomics assessments Application of video analytics to quantify risk and suggest remediation actions
Hazardous waste, water and wastewater mgmt	Able to enter and calculate sampling data Able to track waste inventory Support permit limit tracking, deviations and/or exceedances	Submit manifests directly to the EPA Can select and rank approved transportation firms for disposal mgmt OOTB reporting templates covering many regions
Document mgmt	Support document version tracking, bulk import of documents and granular security permissions for editing, viewing, creating and deleting documents Reliant on third-party document alteration software such as SharePoint	In-built document editing tool with support for collaborative reporting and sequential or parallel approval workflows Highly granular security and audit trails; able to define permissions access at the field level and view which IP address has edited/viewed
Control of work	Can complete JHAs and store and associate LOTO data to assets Limited OOTB process safety capabilities	Visualization of permits to identify conflicts (SIMOPs) Multiple OOTB process hazard methodologies, including bow-tie Dedicated shift handover functionality

Figure 4 (continued) ↓

Figure 4 (continued)

Management of change	Full MOC workflow including submitting a change request, various stages of approval and audit trail of change	Multiple OOTB MOC workflows for various change types, including process safety, e.g. pre-startup safety review
Occupational health	Able to securely store health data and schedule visits with medical practitioners OOTB approval workflows for return to work and claims mgmt	Fit-for-duty workflows can tie in health practitioners and automate approvals Use of dedicated wellbeing partnerships
Training mgmt	Ability to upload SCORM-compliant training content as well as schedule and track training in a robust manner	Provide 1,000+ training courses OOTB Support individualized training enrolment based on a worker's unique risk profile
Chemicals mgmt	Software acts as database for SDSs, allowing SDS content to be viewed on the web or mobile app SDS content is supplied through partnerships Chemical incident mgmt workflows can be configured	In-house team of experts maintain an SDS library Granular chemical approvals (multiple processes) and inventory mgmt using a live, virtual site view Direct reporting capabilities to agencies
Contractor mgmt	Contractor pre-qualification supported through document requests Contractors can access a sub-set of the EHS mgmt system Contractor-specific dashboards to monitor key KPIs	Dedicated contractor portal to verify contractor compliance Employee-level, contractor-level and project-level contractor mgmt Contractor league table with normalized KPIs to compare and select best-fit contractors
Actions mgmt	Core competency of mgmt platforms Able to assign responsible parties, define and automate escalations	Automatically generate actions and due dates based on multiple criteria, such as action priority Group assignment of actions
EHS risk mgmt	Many ways to define controls and identify and prioritize risks Robust risk register and mass alert functionality for crisis scenarios	Use of AI to extract compliance obligations Barrier mgmt to view control effectiveness Cross-module linkages between risks and controls
Audits and inspections mgmt	Robust capabilities to create, schedule, complete and track progress of audits Edit audit checklists using in-built tools and pull in checklists from content providers	Ability to view auditors' availability when scheduling Automatically suggest actions based on historical audits Conferencing for remote audits
Safety and incident mgmt	Multiple workflows dependent on incident severity Many incident analysis and event capture tools, including voice-to-text, geolocation, actions mgmt in app, etc.	Use of AI to automatically suggest actions or report using WhatsApp Incidents tied to operational and business risk

- High differentiation within the market
- Moderate differentiation within the market
- Commoditized functionality; all GQ vendors display strengths

Source: Verdantix analysis

The Application Of AI, Machine Learning And IoT Data Streams Is Diffusing Throughout EHS Workflows

Analysis of the 23 Green Quadrant providers highlights competency across the market within core EHS modules, meaning that buyers seeking vanilla EHS workflows are faced with an assortment of suitable products. High levels of divergence are apparent for niche workflows and closely linked operational and ESG functional areas. Based on our analysis of product demonstrations and Green Quadrant functional responses, we find that:

- **Improved data sources through IoT will facilitate proactive risk management strategies.**
  EHS software firms are primed for IoT device integration through the vast use of REST (representational state transfer) application programming interface (API) strategies. Additionally, providers built on a microservices architecture – such as Cority, Intelex and VelocityEHS – are well-suited to large-scale IoT deployments. Meanwhile, Enablon's third-party integration with OSIsoft can be used for inputting real-time operational data. Whilst EHS software firms are capable of IoT data streams, we have not yet seen widespread integration of connected devices for EHS use cases. At present, the high cost of hardware is limiting investment, although Verdantix has seen evidence of smaller-scale deployments for niche use cases, such as DNV's integration of wearable sensors for radiation monitoring and Cority's IH exposure monitoring. Ever-lowering hardware costs, and the presence of IoT firms such as Rombit, means that Verdantix anticipates expanding IoT ecosystems.

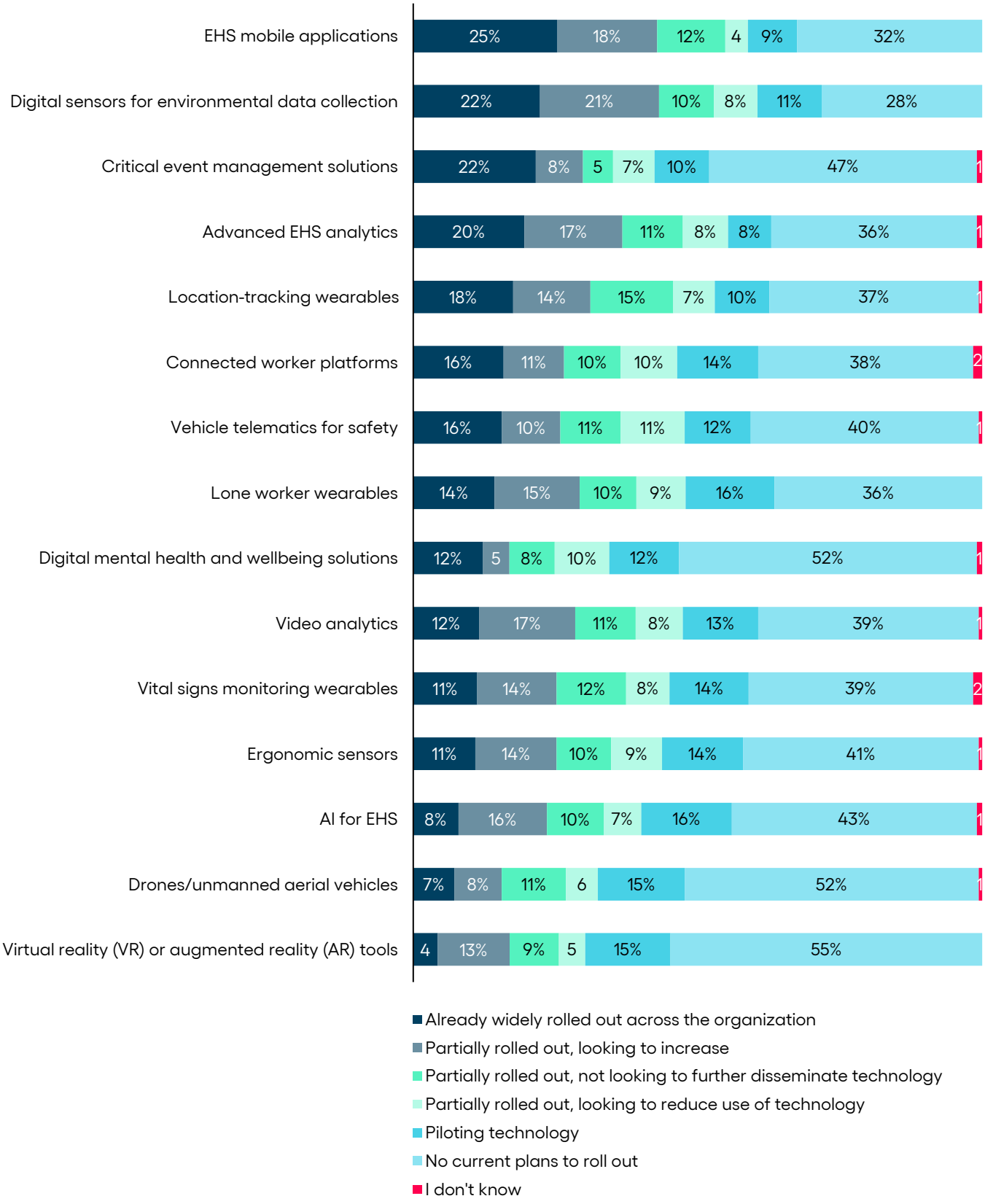
- **AI is slowly but surely augmenting software capabilities and bolstering automation.**
  Through analysis of vendor offerings, it is apparent that AI is branching out to all areas of EHS software. There are three broad machine learning (ML) subfields being deployed: computer vision to monitor images and video footage for non-compliance and hazards; natural language processing (NLP) for streamlining EHS documentation and compliance; and recommendation and analytics engines to support decision-making and data cleansing (see Verdantix Strategic Focus: Improving Health And Safety With AI). Through product demonstrations, Verdantix witnessed Cority's CorInsights tool, an AI-driven notification tool available on records providing insights on incident trends, common corrective actions or average days taken to complete an investigation. Benchmark ESG also has a series of AI Advisors, offering automated identification of potential serious injuries and fatalities (PSIFs). As AI remains a technology-industry buzzword, buyers will need to use discernment to select truly value-added AI features.

- **Cloud-hosted deployment and mobile apps are a must-have.**
  Verdantix global survey data found that only 32% of organizations have no plans to use a dedicated EHS mobile app in 2023 (see **Figure 5**). Moreover, all the participating Green Quadrant firms offer a mobile app that supports incident event capture and audits and inspection reporting at a minimum. It is apparent that EHS mobile apps are no longer a value-add, but rather a must-have in customers' eyes. This is reiterated through vendor pricing strategies, with the majority of firms grouping mobile app deployment within their overall module price – essentially charging no additional fee for the use of mobile. Although mobile apps are the norm, buyers should be cognizant of divergent app strategies in terms of the use of progressive web apps (PWA) or native apps. Further evidence of technology enhancements can be seen in the percentage of customers on multi-tenant cloud deployments. Eight of our benchmarked providers have 99% or more of their customers on multi-tenant deployments.

Figure 5

Adoption Of Digital Technologies In 2023

To what extent will your firm roll out the following digital technologies in 2023?



Note. Data labels are rounded to zero decimal places; percentages less than 7% have been written as numbers

Source: Verdantix Global Corporate Survey 2022: EHS Budgets, Priorities And Tech Preferences

N=302

Future Product Development Will Continue To Prioritize ESG And A Back-To-Basics EHS Management Approach

Product development news has been dominated by the ESG and sustainability megatrend over the past two years. Whilst we have seen notable developments in this area, the materialization of the use of AI, IoT and computer vision marks a pivotal change in the direction of the market as their utility comes to fruition. To better understand the future direction of the market, Verdantix analysed EHS megatrends.

EHS Software Will Be Tasked With Facilitating Zero-Incident Rates And Broadening Worker Health Management

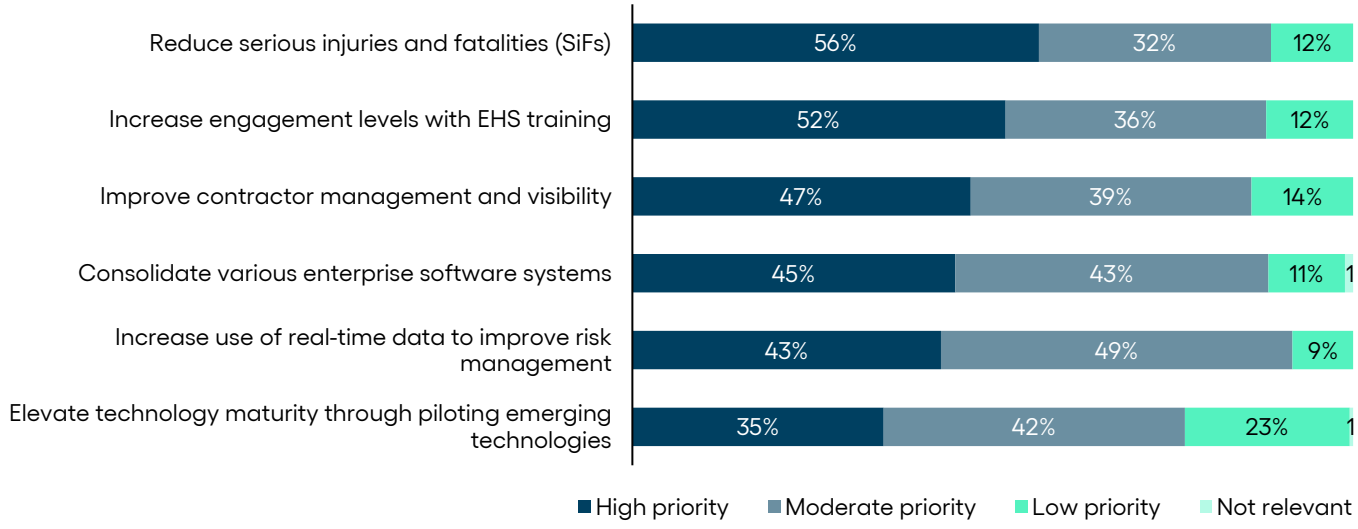
Given that the EHS Software Green Quadrant is updated every two years, Verdantix takes a forward-looking approach to understand which areas of software functionality will continue to dominate customer priorities over the next two years (see **Figure 6**). Verdantix anticipates that EHS buyers, and hence software product development, will aim to:

- **Reduce serious injuries and fatalities (SiFs) by interfacing with new technologies.** Safety management has, and will continue to be, a top priority area for EHS decision-makers. Due to improvements in safety management, safety cultures and technology, data from the US Bureau of Labor Statistics show a steady decline in non-fatal workplace injuries over the past 20 years (see Verdantix The Future Of The EHS Function). However, the number of fatalities has largely flatlined (there were 5,575 workplace fatalities in 2003 and 5,250 in 2018). Tying together EHS and process safety, ensuring adequate risk barriers and monitoring risk in real time will all contribute to eliminating workplace fatalities. There is already evidence of technology enhancements in these areas, such as Enablon's dynamic BowTie application, which shows the shift-to-shift status of barrier health and risk levels of an asset, and Protex AI's use of computer vision to flag near-misses. Digital twins and connected assets will continue to present strong benefits to process safety through remote management and prediction of process failures or overloads (see Verdantix Strategic Focus: How Digital Twins Enable New EHS Collaboration).

Figure 6

EHS Function Priorities Over The Next Two Years

What level of priority are the following goals for your EHS function over the next two years?



Note. Data labels are rounded to zero decimal places; percentages less than 7% have been written as numbers

Source: Verdantix Global Corporate Survey 2022: EHS Budgets, Priorities And Tech Preferences

N=302

- **Expand the use of AI to enhance decision-making and improve data quality.**
  At present, EHS software use cases for AI encompass non-conformance detection through computer vision, virtual assistants, and streamlining compliance and decision-making. However, as volumes of EHS data increase due to IoT device integration, the ability to leverage AI expands, opening the potential for predictive and even prescriptive analytics. Additionally, as EHS provides critical data for ESG disclosures, environmental data will come under heightened scrutiny. To provide investor-grade EHS data, organizations can leverage AI to enhance data cleansing (see Verdantix Strategic Focus: Transitioning To Investor-Grade ESG Data And Decision-Making). For instance, AI can look for discrepancies and similarities in data entered from other operators; based on behavioural metrics, it can determine the 'trustworthiness' of the data entered. AI can also be used to make estimates, conduct data standardization and correct errant data using historical records, all of which are highly applicable for supplier-submitted data.

- **Improve total worker health.**
  COVID-19 instigated broader discussion around worker mental health and wellness, leading to it becoming a prominent trend within EHS. Our 2021 global survey found that an overwhelming majority (94%) of EHS decision-makers expected to assume greater responsibility for worker wellbeing as a result of COVID-19 (see Verdantix Global Corporate Survey 2021: EHS Budgets, Priorities And Tech Preferences). Whilst worker wellbeing is the responsibility of numerous functional areas, such as human resources (HR), there is clearly an onus on EHS to encompass mental health aspects. Verdantix analysis finds that EHS software has expansive room to develop functionality for mental health management and overall understanding of human risk (see Verdantix Growing Mental Health App Market Presents Opportunities For EHS Software Providers). There is some evidence of progression in this area; consider Cority's employee-based risk solution that lets workers assess and quantify the effect that personal factors, such as physical ability, fatigue or mental state, may have on their risk exposure.

EHS Software's Applicability To ESG Will Expand The Addressable Market And Increase Interest From Multinational Software Firms

Despite EHS software being a long-established market, the potential for further innovation remains high. Given modern-day technology capabilities, software vendors have dipped their toes into a new era of AI and big-data-enabled automation that holds the potential to drive down workplace fatalities. Verdantix also considered how market dynamics are likely to evolve in the future. We found that:

- **ESG functionality will play a bigger role in procurement for more buyers.**
  Owing to the huge untapped revenue potential lying in wait, ESG-related functional developments have dominated market focus. While some organizations are seeking to go beyond compliance by setting aggressive zero carbon targets and implementing other initiatives, spend on ESG software is ultimately driven by regulation, and for the time being, is dominated by the 'E' pillar (see Verdantix FTSE 100 Net Zero Emissions Targets Reveal Critical Success Factors). Verdantix finds that the regulatory landscape is only becoming more stringent. In 2024, 49,000 EU firms will have to report environmental and social impacts under the Corporate Sustainability Reporting Directive (CSRD). Tightening of ESG regulations will also happen in the US for around 6,500 publicly listed firms, which will be required to report their Scope 1 and 2 emissions and their Scope 3 subject to materiality, according to the proposed Securities and Exchange Commission (SEC) climate risk disclosure rules (see Verdantix Global Corporate Survey 2022: ESG & Sustainability Budgets, Priorities And Tech Preferences). The broadening applicability of environmental reporting will result in customers increasingly combining ESG functionality alongside EHS, particularly in high-risk industries.

- **Firms will increasingly target the mid-market segment through pre-packaged offerings.**
  Aided by COVID-driven digitization, fewer customers are coming from Excel or paper-based workflows; our survey data find that around two-thirds of organizations expect to eliminate paper-based EHS processes by 2023 (see Verdantix Global Corporate Survey 2021: EHS Budgets, Priorities And Tech Preferences). Rather, most organizations are progressing up the maturity curve in a bid to implement integrated EHS platforms with high-quality data that will aid proactive risk management. There are nuances to the maturity journey, however; Verdantix finds that mid-market firms with limited EHS resources are lagging on their EHS sophistication (see Verdantix Market Insight: Winning Mid-Market Strategies For EHS Software Vendors). As an easy point of entry for buyers, some providers are offering pre-packaged solutions aimed at less mature organizations or specific industry verticals. Example firms with this strategy include Ideagen, TenForce and UL. Going forward, Verdantix anticipates broader availability of fast-to-deploy and scalable pre-packaged offerings.

- **ERPs and large enterprise firms will view EHS as an attractive gateway to the ESG market.**
  The barrier to entry for the EHS software market is high: competition, particularly in Europe and North America, is intense and cost competitive; EHS software development requires teams with many years of subject matter expertise; and the development of proprietary calculation engines is expensive. However, Verdantix sees potential for large organizations, such as enterprise resource planning (ERP) vendors with expansive financial resources, to enter the market. An interesting example is the acquisition of Quentic by AMCS, a global software provider, in May 2022. As ESG reporting requirements broaden, large enterprise firms may view EHS software as a gateway to tapping into the lucrative environmental management space. Consider IBM's acquisition of Envizi – a carbon, energy and ESG software provider – in January 2022. The deal reflects the growing investment in the carbon, climate and environmental management space.

Green Quadrant For EHS Software 2023

Buyers of EHS software from various industries and geographies seek scalable, configurable and easy-to-use solutions that not only enable strong foundations for safety management, but also engage workers on integrated EHS risk management, safety culture improvements and environmental compliance. While adoption of EHS software for incident and safety management constitutes the most common use case, customers give preference to vendors who are able to offer a breadth of industry-specific EHS digital solutions. For the purposes of this report, Verdantix defines EHS software as:

> *"Enterprise-scale software that enables firms to capture, analyse and report data, manage risks and improve business performance across the full range of environmental, health and safety business processes and impact areas."*

This definition does not include software designed to be deployed on a site-by-site basis, applications used for regulatory content management, or software or applications with a focus on a single or select few impact areas, such as carbon management, injury reporting or water compliance management. It also excludes mobile-centric EHS software solutions that lack the breadth and depth of enterprise-scale applications. The assessment includes both applications deployed on-premise and those that are cloud-hosted.

Green Quadrant Methodology

The Verdantix Green Quadrant methodology provides buyers of specific products or services with a structured assessment of comparable offerings at a certain point in time. The methodology supports purchase decisions by identifying potential vendors, structuring relevant purchase criteria through discussions with buyers and providing an evidence-based assessment of the products or services in the market. To ensure objectivity of the study results, the research process is guided by:

- **Transparent inclusion.**
  We aim to analyse all providers that qualify for inclusion in the research. For those providers that provide insufficient information or are unwilling to cooperate fully on the 353-point questionnaire and two-and-a-half-hour product demonstration, we include them in the report based on public information, where this would provide an accurate analysis of their market positioning.
- **Analysis from the buyer's perspective.**
  We integrate findings from our global corporate EHS survey of 302 senior decision-makers, many of whom have bought or plan to buy software products such as those analysed in the Green Quadrant, and from our market size and forecast for EHS software. The data-driven survey findings and market sizing inform how we define the relevant software categories, sub-categories and weightings that propel the Green Quadrant graphic output.
- **Reliance on professional integrity.**
  As it is not feasible to check all data and claims made by vendors, we emphasize the need for professional integrity. Assertions made by software providers are put in the public domain via the Verdantix report and can be checked by competitors and existing customers. Verdantix also retains previous iterations of vendors' Green Quadrant questionnaire responses and makes comparisons and scoring adjustments as needed, to ensure accuracy.
- **Scores based on evidence.**
  To assess software vendors' expertise, resources, business results and strategies, we gather evidence from public sources and conduct interviews with multiple spokespeople and industry experts. When providers claim to be 'best in class,' we challenge them to present supporting evidence.

- **Comparison based on relative capabilities.**
  We construct measurement scales ranging from 'worst in class' to 'best in class' performance at a certain point in time. A provider's position in the market can change over time, depending on how its offering and success evolves relative to its competitors. As a result, a vendor's Quadrant positioning may not necessarily improve — even if it adds new applications, makes a strategic acquisition or receives investment — as the assessment is relative to what other vendors are offering or have been doing since the previous Green Quadrant study. The Green Quadrant for EHS software is typically repeated every two years.

Scope And Methodology Updates For The 2023 Green Quadrant EHS Software Study

Verdantix studies reflect the current state of customer requirements and product capabilities. As such, we have updated the assessment criteria to ensure alignment with the current state of the market. Updates to the 2023 Green Quadrant EHS Software study feature:

- **Restructuring of the contractor management and occupational health (OH) categories.**
  The 2021 EHS Software Green Quadrant featured pandemic management as a distinct functional category. Reflecting quelling demand for pandemic management functionality, Verdantix consolidated this category and incorporated it in the OH assessment. Contractor management also received a notable facelift. Its sub-category groupings now reflect the Verdantix functional segmentation across pre-qualification and onboarding, contractor control of work, contractor training, contractor safety management and site access control (see Verdantix Buyer's Guide 2021: Contractor Safety Management Software).

- **Adjustment of functional category weightings to reflect current and future priorities.**
  The Verdantix Green Quadrant evaluates the latest customer technology preferences to ensure that the weightings of all high-level criteria reflect global buyers' current priorities across all EHS software components. Given the wealth of product development and spend dedicated to environmental management, the categories relating to GHG emissions, air emissions and ESG and sustainability management received increased weightings. To compensate for these increases, categories that constitute a lower percentage of total EHS software spend, namely IH and OH, received slightly reduced weightings.

- **Creation of a control of work functional category.**
  Owing to the growing interlinkage between EHS and ORM functionality, Verdantix created a distinct category for control of work. This assesses vendors' ability to support permit to work management, job hazard analyses (JHAs), process safety management and shift management.

- **Expansion of ESG and sustainability to reflect broader capabilities available in the market.**
  The previous iteration of the Green Quadrant assessed vendors' ESG reporting and stakeholder management capabilities. Due to the rapid product development in this area, Verdantix has expanded the scope of the ESG and sustainability management category. Vendors are now also assessed on Task Force on Climate-Related Financial Disclosures (TCFD) reporting and their ability to support other frameworks, target management and performance forecasting.

Evaluated Firms: Selection Criteria

Verdantix tracks over 300 EHS software vendors globally. To ensure that the Green Quadrant analysis only compares firms providing similar products at a comparable level, we define the criteria for including vendors in the assessment. The 23 EHS software vendors included in this study have:

- **Software supporting broad EHS management functions.**
  Reflecting the market trend of corporate customers buying comprehensive EHS software platform solutions, we screen to include only vendors that have diversified EHS applications to manage the broad spectrum of EHS processes being assessed. To ensure comparability, this criterion eliminates numerous software products focused on only one, or a few, areas, such as environmental management or health and safety management.
- **Annual revenues of at least $8 million and 40 or more named EHS software customers.**
  The Verdantix Green Quadrant EHS Software study is intended to assess the most prominent vendors offering EHS software platform solutions across environmental compliance, OH, incident and safety, quality, and sustainability management. The vendors included in this Green Quadrant study have annual EHS software revenues ranging from $8 million to over $100 million. All vendors disclosed at least 40 named customers who adopted and deployed their EHS software in 2021.
- **Resources to deliver a broad EHS suite.**
  We focused the study on vendors with the human, financial and technological resources to meet the needs of diverse customers for the foreseeable future. This criterion reflects the desire of most customers to ultimately use a single EHS software platform to manage all their EHS processes globally.

Based on the inclusion criteria above, this report looks in depth at the EHS software platforms available from 23 vendors: Alcumus, Benchmark ESG, Cority, DevonWay, DNV, EcoOnline, ecoPortal, Enablon, Evotix, HSI, Ideagen, Intelex, IsoMetrix, Origami Risk, ProcessMAP, Quentic, SAI360, SAP, Sphera, StarTex, TenForce, UL and VelocityEHS. Twenty-two of the 23 vendors featured in the study actively participated in the research through responses to a 353-point questionnaire and by providing a two-and-a-half-hour product demonstration. SAP is the only featured provider that declined to participate. Verdantix scored the provider using SAP-supplied data from the 2021 EHS Software Green Quadrant benchmarking report.

Other example and emerging vendors active in the EHS software market who can be considered, but who did not meet our specific inclusion criteria, include BlueKanGo, ComplianceQuest, Dakota Software, Damstra, EMEX, GOARC, INX Software, KPA, Noggin, Red-on-line, SafetySkills, SafetyTek, Simple But Needed (SBN) Software, Vector Solutions, VisiumKMS and Xybion.

Evaluation Criteria For EHS Software

Verdantix defined the evaluation criteria for the Green Quadrant EHS Software study using a combination of interviews with corporate practice managers and software executives, desk research, discussions with multiple customers and staff expertise. Analysis was also informed by previous Green Quadrant assessments and responses to the Verdantix global corporate EHS survey. In full, this year's Green Quadrant analysis compares offerings from 23 software vendors using a 353-point questionnaire covering seven categories of technical capabilities, 19 categories of functional capabilities and 11 categories of market momentum. To maximize the value of this report, readers should understand that:

- **Capabilities measures breadth and depth of functionality.**
  The Capabilities dimension, plotted on the vertical axis of the Green Quadrant graphic, is a measure of the breadth and depth of each software provider's functionality. To assess this, we evaluated data for seven technical capabilities and 19 functional capabilities: database design and data integrations; master data

management; mobile solutions; business intelligence (BI); configurability; user interface (UI); application and data centre security; air emissions; audit and inspections management; chemicals management; contractor safety management; control of work; document management; training; ergonomics; GHG emissions; hazardous waste; IH; incident management; management of change; OH; quality management; EHS compliance and risk management; safety management; ESG and sustainability management; and water and wastewater management.

- **Momentum measures strategic success factors.**
  The Momentum dimension, plotted on the horizontal axis of the Green Quadrant graphic, measures each software vendor on a range of strategic success factors. The criteria that make up the Momentum score are grouped into 11 high-level categories: brand preference; vision and strategy; market focus; partnerships; new customers; installed customer base; deal volume and size; deployment; organizational resources; customer success and adoption; and financial resources and growth.

We scored all sub-categories at zero, one, two or three, with zero reflecting 'no capability' and three being 'best in class'. Each sub-category has a percentage weighting that dictates how much of a contribution it makes to the high-level Capabilities or Momentum scores. The combination of high-level category scores in the Capabilities and Momentum sections generates the Green Quadrant graphic and rankings. (See **Figure 7**, **Figure 8** and **Figure 9** for details of the study criteria, and **Figure 10** and **Figure 11** for the scoring for all participants against the criteria. For the Green Quadrant graphic summarizing the positioning of all EHS software vendors in this benchmark study, see **Figure 12**.)

Figure 7

Technical Capabilities Criteria For EHS Software Applications

Capabilities	Questions
Database Design & Data Integrations (4%)	Which database(s) does the application run on? What scalability/clustering can you demonstrate with customer deployments? What functionality is available to capture data from sensors, meters or edge devices such as wearables?
Master Data Management (2%)	What functionality is available to define, manipulate and change organizational, asset-level and site-level data? What functionality exists for managing regulatory data retention?
Mobile Solutions (5%)	What usage scenarios does your mobile apps portfolio address? What offline functionality does your mobile app offer? How many downloads and active users do the applications have? What parts of the mobile solution can be configured?
Business Intelligence (3%)	What is the quality of the business intelligence application? Is it embedded or provided via a third party? What is the quality of the dashboard? What data discovery, benchmarking, reporting, analysis, charting and forecasting tools are available?
Configurability (4%)	How can forms, measurement metrics, business rules and role-based user rights be (re)configured? How can terminology be redefined? How can the user interface and workflow be (re)configured? How can the dashboard be configured to meet individual needs? What other elements can be configured?
User Interface (5%)	What is the usability/user-friendliness of the enterprise app interface and mobile app interface? How many languages are provided out of the box? How does the software support enhanced user adoption and engage customers?
Application & Data Centre Security (2%)	What is the frequency of vulnerability testing on the software, and how are the tests performed? Are you SOC2 or ISO 27001/27002 certified? What data recovery agreements have been put in place?

Source: Verdantix survey

Figure 8

Functional Capabilities Criteria For EHS Software Applications

Capabilities	Questions
Air Emissions (4%)	Which air emissions regulations is the application designed to support? What pre-configured workflow is available out of the box? What pre-defined forms are included in the app? What are the properties of the calculation engine, including speed, configurability and included formulas?
Audit & Inspections Management (5%)	What functionality is provided to support the scheduling of EHS audits? What functionality is provided to import, create and change checklists for EHS audits? How are customers able to schedule and close out follow-up actions? Which customers are using the software for audit management?
Chemicals Management (4%)	Which specific regulated chemicals inventories is the application designed to support? How does the software support hazardous materials data management, hazard communications, SDSs, and HAZMAT labelling? What functionality is provided to support chemicals inventory management and general compliance? What functionality is provided to support toxicology analyses and the identification of alternative chemicals?
Contractor Safety Management (2%)	What functionality is provided to facilitate contractor pre-qualification, final qualification and pre-work activities, work-in-progress engagement, and other EHS performance-related requirements for contractors? How can firms manage contractor control of work? How can hiring clients manage initial and ongoing training of contractors and training credentials? How can firms manage contractor safety and site access?
Control of Work (4%)	How does the software support process hazard/safety analysis? What functionality is provided for fall protection, confined space, fire safety, machine safety, permit to work, and safety objective management? What functionality is provided to support the distribution of critical information during shift handover?
Document Management (2%)	What functionality does the software have regarding document alteration? How does it manage document version control? What methods of document import and export are available? Can documents be audited to track changes over time? Are e-signatures enabled?
EHS Compliance & Risk Management (6%)	What functionality is provided for risk identification and risk assessments? How does the software maintain an operational risk register? What functionality is provided for emergency response management?
Ergonomics (2%)	What functionality is provided to support ergonomics audits and inspections? How does the software identify and report on ergonomics hazards? Which customers are using the software for ergonomics management?
ESG & Sustainability Management (8%)	What functionality is offered to support TCFD, TCFD-aligned carbon and climate risk/opportunity, and reporting to other sustainability frameworks? How does the software enable users to set interim and final targets for net zero and what performance metrics are available? What functionality is in place to manage sustainability programmes and manage reporting? How does the application forecast future sustainability performance? What functionality is there for stakeholder engagement and CSR initiatives? What functionality is there for conducting and managing materiality analysis?
GHG Emissions (5%)	Which GHG regulations does the application support out of the box? What is the SLA for country and/or state-level grid factors? What is the proven capability of the calculation engine? Which customers are using the software for GHG management?
Hazardous Waste (3%)	Which hazardous waste regulations is the application designed to support? What is the quality and range of pre-built regulatory reports for hazardous waste management? What functionality is provided to support hazardous waste inventory and waste disposal management?

Figure 8 (continued) ↓

Figure 8 (continued)

Incident Management (7%)	What functionality is provided to track, manage and analyse incidents? How does the software support corrective and preventative actions? What functionality is provided to auto-populate regulatory reports for incidents? How does the software facilitate workers' compensation management?
Industrial Hygiene (3%)	What functionality is provided to inventory and track equipment calibration/ inspection activity? How does the software store, manage and report air, bulk and wipe sampling data? How does the software manage similar exposure groups (SEGs) and associated statistical analysis?
Management Of Change (2%)	What functionality is available to handle MOC workflow and approvals? How do MOC processes integrate with other software elements? Which customers are using the software for MOC?
Occupational Health (3%)	What functionality is provided for fit-for-duty work assessments and tracking of restrictions? How does the software maintain and manage employee medical data and records? Can the software maintain wellness programmes? What functionality is provided for occupational illness/injury reporting? What functionality is provided to manage travel risk and COVID-19 risk, including immunization?
Quality Management (3%)	What functionality is offered for corrective and preventive actions (CAPA)? Can the software assist with quality management in terms of suppliers, product design, equipment maintenance, and customer feedback? Do customers frequently leverage EHS and quality elements of the software together?
Safety Management (5%)	What functionality and content is provided to support compliance with safety regulations? What functionality is provided to support behaviour-based safety and job hazard/safety analysis? What functionality is provided for safety meetings and objectives management? What functionality is provided to support lone worker safety?
Training (4%)	Does the software include training modules on various EHS topics? Does it use a third party to provide this content? What functionality is available to schedule training and track individual and team progress?
Water & Wastewater Management (3%)	Which water and wastewater regulations is the application designed to support? Which water emissions does the application cover out of the box? What functionality is provided for discharge rate reporting and wastewater compliance?

Source: Verdantix survey

Figure 9

Momentum Criteria For EHS Software Applications

Momentum	Questions
Brand Preference (10%)	What are the awareness and perception levels of 302 EHS leaders from the Verdantix EHS Leaders Global Survey for the supplier?
Vision & Strategy (5%)	What market vision does the supplier have? Is the supplier's business and product strategy aligned to the evolving requirements of customers?
Market Focus (5%)	Does the supplier have other revenue streams outside of EHS software? How involved is the supplier with industry events and standards bodies?
Partnerships (5%)	How many consulting partners does the supplier work with? Does the firm have hardware and software partners such as regulatory content partners?
New EHS Customers (15%)	How many new EHS software customers did the supplier win? What were the revenues of new customers?
Installed EHS Customer Base (10%)	In the most recent reporting year, how many customer contracts did the supplier have? What were the revenues of the firms with these contracts?
Deal Volume & Size (5%)	How many deals did the supplier close across different revenue size firms? What were the total values of these deals?
Deployment (5%)	What types of deployment options does the vendor offer? How many scheduled releases are there in a year? What is the average time needed to go live?
Organizational Resources (10%)	In how many countries does the vendor have offices, provide technical support and host the software? How many employees does the supplier have? Has the supplier grown through acquisition?
Customer Success & Adoption (10%)	How many FTE employees are dedicated to customer success and support? What is the average response time? How is customer satisfaction measured?
Financial Resources & Growth (20%)	What are the supplier's annual EHS software revenues in the most recent reporting year? How much did the revenue size change compared with prior years? What percentage of the EHS software revenues is subscriptions?

Source: Verdantix survey

Figure 10

Vendor Category Scores (Capabilities)

	Alcumus	Benchmark ESG	Cority	DevonWay	DNV	EcoOnline	ecoPortal	Enablon	Evotix	HSI	Ideagen	Intelex
Database Design & Data Integrations	1.4	1.9	2.5	1.5	2.0	1.6	1.5	2.0	1.0	1.6	0.6	2.3
Master Data Management	1.7	2.2	2.8	1.3	1.5	2.0	1.2	2.8	1.7	1.2	1.0	2.7
Mobile Solutions	1.6	2.5	2.5	1.2	1.4	2.3	1.6	2.6	2.5	1.6	0.8	2.4
Business Intelligence	1.0	2.4	2.8	1.2	1.4	1.6	1.2	2.6	1.8	0.8	1.0	2.4
Configurability	1.1	1.8	2.4	1.9	1.4	2.1	1.6	2.6	1.8	2.0	1.3	2.5
User Interface	1.6	2.0	2.4	1.8	1.4	2.4	1.8	2.6	2.2	1.8	1.2	2.6
Applications & Data Centre Security	2.2	1.9	2.5	2.0	1.8	2.5	1.3	2.0	2.3	1.6	2.0	2.5
Air Emissions	1.6	2.0	2.6	0.8	1.3	1.6	0.2	2.5	0.6	0.7	0.0	2.3
Audit & Inspections Management	1.5	2.1	2.6	1.5	1.7	1.7	1.1	2.4	1.8	1.5	1.2	2.5
Chemicals Management	1.9	2.0	2.3	1.1	0.9	2.1	0.9	2.1	0.9	1.8	0.5	1.6
Contractor Safety Management	2.5	1.8	2.2	1.3	1.5	1.7	1.8	2.3	2.2	1.8	0.8	2.2
Control of Work	1.3	2.0	2.0	1.5	1.5	1.0	1.0	2.8	1.0	1.0	0.0	2.3
Document Management	1.1	1.9	2.2	1.6	1.0	1.4	0.9	2.1	1.4	1.6	2.5	1.9
EHS Compliance & Risk Management	1.3	2.1	2.4	1.3	1.7	1.9	1.3	2.7	1.6	1.1	1.6	2.3
Ergonomics	1.5	2.0	2.3	1.3	1.0	1.3	1.0	2.3	1.5	1.3	0.3	2.3
ESG & Sustainability Management	0.6	1.8	2.5	0.9	1.4	1.2	0.4	2.5	1.0	0.6	0.0	2.0
GHG Emissions	1.5	2.1	2.7	0.7	1.5	0.8	0.8	2.4	0.6	1.0	0.1	2.1
Hazardous Waste	1.0	2.0	2.6	1.7	1.1	0.9	0.0	2.3	0.9	0.9	0.0	2.4
Incident Management	1.6	2.1	2.3	1.3	1.4	1.7	1.4	2.7	1.6	1.4	1.1	2.4
Industrial Hygiene	1.0	2.0	2.7	1.6	1.1	0.1	0.6	2.1	1.0	0.4	0.0	2.6
Management Of Change	1.0	2.0	2.3	1.3	1.3	0.3	0.8	2.3	1.0	0.8	0.3	2.3
Occupational Health	1.5	2.0	2.8	1.4	1.4	0.2	1.0	2.7	1.1	1.7	0.2	2.3
Quality Management	1.6	1.6	2.1	1.9	1.1	0.9	0.9	2.0	0.8	1.1	2.7	2.6
Safety Management	1.7	2.4	2.7	1.5	1.8	1.8	1.6	2.7	1.9	1.7	1.4	2.7
Training	1.8	2.0	2.4	0.6	0.4	1.8	1.0	1.8	2.2	2.6	1.8	2.0
Water & Wastewater Management	1.3	2.3	2.8	1.3	1.8	2.0	0.0	2.3	1.0	1.0	0.0	2.5

Figure 10 (continued) ↓

Figure 10 (continued)

	IsoMetrix	Origami Risk	ProcessMAP	Quentic	SAI360	SAP	Sphera	StarTex	TenForce	UL	VelocityEHS
Database Design & Data Integrations	1.8	1.8	1.3	1.4	2.0	1.9	2.3	1.0	2.0	1.5	1.8
Master Data Management	2.2	1.3	1.7	2.2	2.3	1.7	2.2	1.0	1.7	2.2	2.3
Mobile Solutions	1.5	1.9	2.3	2.2	2.3	1.9	2.2	1.3	1.6	1.3	2.1
Business Intelligence	2.4	1.0	2.2	1.4	2.0	1.2	2.8	1.0	1.4	1.8	2.0
Configurability	1.9	1.3	1.3	2.0	2.6	1.1	2.6	1.3	1.4	1.8	2.0
User Interface	1.8	1.6	2.0	2.2	2.0	1.4	2.4	1.4	1.6	1.6	2.2
Applications & Data Centre Security	2.2	1.7	2.4	1.8	2.5	1.8	2.3	1.8	2.2	2.2	2.7
Air Emissions	1.8	1.2	1.5	1.3	1.6	1.3	2.7	0.3	1.0	1.3	2.4
Audit & Inspections Management	1.9	1.6	1.8	2.1	2.0	1.0	1.9	1.7	1.4	1.7	2.4
Chemicals Management	0.9	1.5	1.5	1.9	1.5	1.0	2.5	0.8	1.1	1.9	2.9
Contractor Safety Management	2.4	1.3	1.2	1.7	2.5	1.0	2.3	1.0	1.8	0.9	2.3
Control of Work	1.5	1.8	2.0	1.5	1.8	1.3	2.5	1.3	2.5	0.8	2.0
Document Management	0.9	1.4	1.7	1.5	1.7	1.4	1.7	0.9	1.1	1.3	2.1
EHS Compliance & Risk Management	2.4	2.4	1.3	1.7	2.6	1.4	2.4	1.3	1.4	1.4	2.1
Ergonomics	1.5	2.3	2.0	1.3	1.8	0.8	1.5	1.0	1.0	1.0	3.0
ESG & Sustainability Management	1.9	1.1	1.6	1.4	1.5	0.6	2.6	0.6	0.5	1.9	2.0
GHG Emissions	1.9	1.0	1.5	1.4	1.7	0.7	3.0	0.0	1.0	2.6	2.4
Hazardous Waste	1.9	1.4	1.6	1.3	1.7	1.0	2.6	1.3	0.6	1.3	2.7
Incident Management	2.1	2.0	1.9	1.9	1.9	1.1	2.1	1.6	1.6	1.4	1.9
Industrial Hygiene	2.0	1.7	2.6	1.4	2.1	1.0	2.0	1.0	0.9	1.4	2.7
Management Of Change	1.3	1.3	1.5	1.3	1.5	1.3	1.5	1.0	1.3	0.8	1.5
Occupational Health	1.7	1.6	1.9	1.6	2.2	1.3	1.9	1.1	0.6	2.0	2.0
Quality Management	1.2	1.2	0.8	1.4	1.0	1.3	1.1	1.1	1.3	1.1	1.4
Safety Management	1.9	1.8	1.9	1.9	2.3	1.4	2.3	1.6	1.7	1.3	2.6
Training	1.0	1.0	1.6	1.8	2.0	1.0	1.2	1.6	1.0	2.2	2.0
Water & Wastewater Management	1.8	1.5	1.5	1.8	1.8	1.0	2.5	1.3	1.0	2.3	2.5

Source: Verdantix analysis

Figure 11

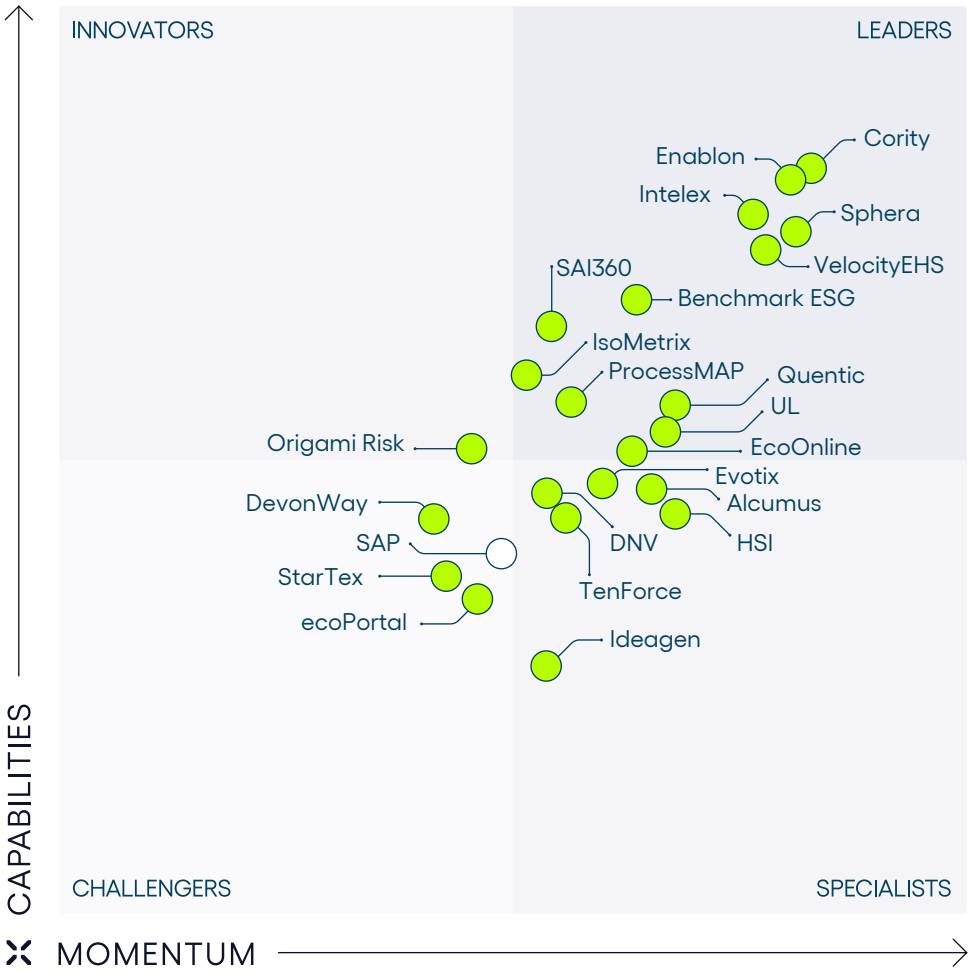
Vendor Category Scores (Momentum)

	Alcumus	Benchmark ESG	Cority	DevonWay	DNV	EcoOnline	ecoPortal	Enablon	Evotix	HSI	Ideagen	Intelex
Brand Preference	2.0	2.3	2.3	1.3	3.0	2.0	1.3	2.3	2.0	2.0	2.0	2.3
Vision & Strategy	2.0	2.0	2.5	2.3	1.5	2.3	2.5	2.5	2.3	1.8	2.0	2.5
Market Focus	2.4	2.5	2.6	1.1	1.9	2.0	1.6	2.8	2.0	1.7	1.8	2.9
Partnerships	1.5	2.5	2.9	1.4	1.9	1.5	0.7	2.4	1.3	1.1	0.5	2.7
New EHS Customers	1.5	2.0	2.9	0.6	1.0	1.3	1.0	2.6	1.3	1.7	1.3	2.3
Installed EHS Customer Base	2.0	1.8	2.4	1.0	1.0	1.6	1.0	2.4	1.6	2.8	1.4	2.2
Deal & Volume Size	2.2	1.8	2.8	1.0	1.5	1.8	1.3	2.7	1.5	2.5	0.8	2.5
Deployment	2.5	2.0	2.7	2.8	2.0	2.6	2.7	2.0	2.5	2.5	1.2	2.8
Organizational Resources	2.0	1.7	2.0	1.7	2.0	2.0	1.0	2.7	1.3	2.3	1.7	2.0
Customer Success & Adoption	1.9	2.3	2.5	1.6	1.1	1.4	1.5	1.7	1.9	1.2	1.6	2.6
Financial Resources & Growth	2.2	1.4	2.4	0.9	1.6	2.5	1.6	2.6	2.3	2.4	2.2	1.9

	IsoMetrix	Origami Risk	ProcessMAP	Quentic	SAI360	SAP	Sphera	StarTex	TenForce	UL	VelocityEHS
Brand Preference	1.7	1.0	2.0	2.0	2.3	3.0	3.0	1.0	1.0	3.0	3.0
Vision & Strategy	2.3	1.8	2.3	2.3	2.0	1.3	2.8	1.8	2.3	2.0	2.5
Market Focus	1.9	1.0	2.2	1.9	0.7	0.5	2.2	1.7	2.1	2.0	2.5
Partnerships	1.7	1.7	1.8	1.0	2.0	2.1	2.1	0.7	1.7	0.9	1.6
New EHS Customers	1.0	0.9	1.0	2.0	1.4	1.0	2.4	1.2	1.6	1.9	2.3
Installed EHS Customer Base	1.2	1.2	1.0	2.0	1.0	1.4	3.0	1.2	2.0	2.2	2.6
Deal & Volume Size	1.3	1.7	1.7	2.8	1.3	1.0	2.2	1.3	1.5	2.2	2.3
Deployment	1.4	2.7	2.7	3.0	1.5	1.2	2.3	2.5	2.2	2.3	2.5
Organizational Resources	1.7	1.3	2.0	1.7	2.0	1.7	2.0	0.7	1.7	2.7	2.7
Customer Success & Adoption	1.7	1.5	1.5	1.8	2.3	1.2	2.2	1.3	1.5	1.9	2.0
Financial Resources & Growth	1.8	1.5	1.9	2.3	1.5	1.5	2.5	1.5	1.7	1.5	2.0

Source: Verdantix analysis

Figure 12
Green Quadrant For EHS Software 2023



Capabilities

This dimension measures each software supplier on the breadth and depth of its software functionality across 26 capability areas, as outlined in Figure 7 & Figure 8.

Momentum

This dimension measures each software supplier on 11 strategic success factors, as outlined in Figure 9.

Note: a white plot indicates a non-participating vendor
Source: Verdantix analysis

SAI360's Integrated Risk Approach Produces An End-To-End EHS Software Offering

Founded in 2008 as part of SAI Global, SAI360 is an enterprise risk management, standards and information management provider. Headquartered in Chicago, SAI360 employs over 450 staff across offices in Asia, Australia, Europe and the Middle East. More than one million users currently access SAI360 in over 50 countries. In 2021 the SAI Global Standards and Assurance divisions were sold to the Intertek Group, and the Risk and Learning practices were rebranded as SAI360. This unified the firm's name and logo around the SAI360 platform, which is the integrated risk management software suite offered today. The provider's vision is evident in its four solutions: ESG; governance, risk and compliance (GRC); EHS and sustainability (EHS&S); and Learning, which are housed in a connected ESG cloud platform. SAI360 has a strong customer base within logistics, metals and mining, oil and gas, utilities, and healthcare and hospitals. The firm has a global customer base across Asia-Pacific (APAC), North America and Europe.

Strengths And Differentiators

Based on the EHS Software Green Quadrant analysis, Verdantix finds that SAI360 has strengths in:

- **EHS compliance, risk and safety management.**
  SAI360 achieved a score of 2.6/3.0 for EHS compliance and risk management, which is among the highest in the category. Compliance risks are managed through SAI360's Obligations Management module, a tool used for managing, monitoring and reporting all types of obligations, not just regulatory. The module, which is also available via mobile, automatically generates compliance actions, notifies users and tracks completion, ensuring accountability and the completion of compliance tasks. Beyond compliance risks, Verdantix found robust functionality across controls management, risk identification and prioritization, risk assessments and risk registers. SAI360 comes with integrated bow-tie capabilities and several risk analysis reports out of the box to help EHS managers rapidly identify areas of concern in their organization.

- **Solution configurability.**
  From a customer perspective, ease of self-configurability is often a highly important factor during software selection. Frustrations arise when customers are reliant on suppliers for frequent and minor configurations. SAI360's 'self-service' configuration means that the same tools used by its implementation partners are available to its customers, leading to SAI360 achieving the highest score in this category. The provider's Designer Toolkit within the main SAI360 web application provides a no-code graphical user interface (UI) with drag-and-drop features to configure forms, terminology and the look and feel of dashboards across both the web and mobile applications. A range of other dedicated tools supports configuration of business rules, workflows and role definitions.

- **Contractor safety management.**
  SAI360 takes an integrated approach to contractor management, generating a score of 2.5/3.0. Its Contractor Management module has capabilities to manage contractor firm details and workers, undertake pre-qualification, track inductions, and issue approvals to enter sites. The Contractor Management register is linked to other safety modules to monitor ongoing performance, allowing for a centralized view of all contractor EHS records. Users can even compare contractors through Contractor League Tables, showing metrics such as the number of incidents in which contractors have been involved, injury rates, unsafe behaviours, drug and alcohol tests, and non-conformances. SAI360 customer Yarra Valley Water uses these tools to automatically allocate work based on contractors' safety performance.

Improvement Opportunities

Based on the EHS Software Green Quadrant analysis, Verdantix finds that SAI360 could improve on:

- **Quality management.**
  With a score of 1.0/3.0 for quality management, SAI360 customers can rely on a combination of contractor, incident, audit, obligations and actions management modules, as well as benefitting from strong overall platform configurability to fulfil quality-related workflows. The solution does have some dedicated functionality; for instance, Quality Consequence, part of the Incident Management process, manages product issues and recalls. The tool can support investigation of product contamination, downgrading and packaging, raw materials shortages and supplier quality issues.

- **Chemicals management.**
  SAI360's score of 1.5/3.0 for chemicals management is just above the category average. The solution features a chemicals register and a partnership with 3E to provide clients with up-to-date access to safety data sheets (SDSs). Within the chemicals register, users can attach SDSs and access associated metadata. For inventory management, users can track chemical storage details, review chemicals for approval by comparing risk ratings, and set up reports based on legislative requirements. Clients with complex chemicals management needs may find that SAI360's lack of associated SDS service offerings and chemicals labelling functionality make it insufficient for their needs.

Selection Advice For Buyers

Considering all supplier offerings assessed in the Green Quadrant analysis, we believe that SAI360 should be shortlisted by:

- **Mid-market firms operating in medium- to very high-risk industries.**
  SAI360 features a customer base that is spread across Australasia, North America, Europe and Asia. Breaking this down further, its core sectors encompass mining and metals, power utilities, oil and gas, construction, pharmaceuticals, and life sciences. Firms across these medium- to very high-risk sectors in need of a single configurable solution with strong mobile capabilities that will also support organizational safety culture transformation should strongly review SAI360's offering. The SAI360 platform is the tool of choice for brands such as 3M, Natural Power and Sandvik.

- **Firms that would benefit from deploying SAI360's GRC and training solutions.**
  Alongside a versatile EHS software platform, prospective buyers should be cognizant of SAI360's broader offerings for GRC, ESG and training solutions. Through SAI360, firms can achieve an overarching view of risk by combining enterprise and operational risk management (ERM and ORM) with EHS risk. This also enables firms to break down data silos by compounding functionality through a single provider.

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