

White Paper

Maturation of Industrial safety systems and progressive shift towards integrated EHS software

Abstract

The coming of age transition for industrial and occupational safety systems has been largely driven by automation. Through the pipelines of digital EHS management solutions that streamline workflows and make accountability through proactive reporting, a priority. Existing and newer laws impacted by stringent compliance(s) and regulatory frameworks can be dealt with confidence and reliability.

In this whitepaper we will explore the interdependent relationships existing within industries and organizations and their elements: operations' and EHS. And interconnect these in form of a wider and more influential EHS ecosystem driven through digital "risk" management tool i.e. EHS software.

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Paradigm shift in industrial ‘thinking’

Industrial development in terms of its demand and production have increased. An evergreen trend which has been a recurrent theme for the past few decades.

“Demand for Manufacturing: Driving Inclusive and Sustainable Industrial Development” is the title of industrial development report 20181 by United Nations Industrial Development Organization (UNIDO).

The remarkable thing about this title are the words ‘inclusive’ and ‘sustainable’ aligned within the same context as industrial development.

The trait of being inclusive and sustainable in the industrial domain has begun to cement its position and among the minds of industry leaders. Leading and prominent industrial sectors are undertaking initiatives to identify their operations across the world along the lines of inclusive and sustainable. However, the significance has gained ground due to twin factors: Growing need to make industrial operations safer and the changes in fortune posed by man-made climate change.

Organizations by far and large have learnt a few lessons from industrial accidents and tragedies. Not only do precious human resources and industrial assets take a hit but chances of unpopular public opinion magnified by vigilance on social media as well as other popular sources, remains a challenge.

Then there is the perpetual issue of causing damage to the environment. All around the globe, in one form or another, governance and policymaking has uplifted the cause of environment. And there is a reason of concern behind its relevance. Man-made climate change that has altered the weather and climatic patterns across the world. It has disrupted human resources and food supplies due to devastation caused by droughts, flooding or altered rainfall.

Therefore, the twin factors of safety and environment have matured. This maturation has occurred in the presence of managing active risks posed by operational hazards in industries. And the negative effect they can exert on the environment within their vicinity.

Industrial thinking is fast changing from being an engine of consumption to trying to learn and become a sustainable one. The consumption model of growth is not a sustainable one. And, industries are realizing this at a rapid rate.

The challenges faced by modern day industries to sustain production are:

- **Fast depleting resources and their management.**
- **Increasingly pricier supply chains and costs of distribution.**
- **Scrutiny from governance, policymakers and independent research bodies.**
- **Vigilant consumer habits and their impact.**

The twin factors, emerging risks and challenges have created the stage for a paradigm shift.

This paradigm shift is about the industries and organizations exploring their options. The shift signifies reconsideration of the older and conventional systems for EHS management.

Conventional systems such as hand-made paper checklists, tabulated sheets or the overall method of verifying EHS aspects through workforce only.

On the fast-paced industrial shop floor, where each second is clocked for efficient operations and automation being the *numero uno*. Paper trails and manual checking of endless rows and columns, hampers productivity.

Promise of digitization

The tool of automation has become a sought after accessory to the human input. Human input is shaped and molded by learning and practice. Automation on the other hand is designed and programmed to process limitless datasets to performing precision machining, among many other tasks that it delivers.

The seven building blocks of digital EHS can be defined by²:

1) Data management

The fundamental ability offered by digitization is EHS data management. The amount of information flowing within the industrial domain (irrespective of their location, if configured) can be accurately captured. This is then available for access to the different levels in the EHS ecosystem. It offers two benefits: readily accessible and usable industrial safety data and uniformity of information distribution, where individual systems are visible to each other and respond.

2) Process and workflow automation

Whether routine or even specialized tasks, both can be managed via automation. The processes become standardized and efficient. This, in turn pushes the reliability factor with time efficiencies that are impossible to achieve via manual methods. Automation and digital workflows also negate the drudgery of data entry and verification. Reducing time consumption and creating more time for workers, to focus on safety and performance issues.

3) Advanced analytics and decision automation

It offers a major point of pivot that industries are exploring with great interest. Data management that feeds unprocessed information into recognizable elements is converted into insights. The journey from data to information to insight is enabled by knowledge engines that identify, respond and generate reports at a click of a button.

The next stage of advanced analytics is currently being influenced by machine learning, artificial intelligence and neural networks. These would shape the way for predictive analytics where reasonably accurate predictive insights would be available for managers to base their EHS decisions upon.

4) Flexible, timely, cohesive infrastructure

An infrastructure of EHS software that is available across devices – PC, phones and tablet. Which is also distributed through hybrid mode of stand-alone and cloud based deployment. Breaking the myths of data silos where information might remain, simply stored and not generating useful insights. The EHS data now spreads as per the requirement posed by industries.

Not only does such infrastructure increase EHS data penetration but it allows its delivery on-demand. Pushing aside guess-work and replacing it with readily accessible knowledge, available through the devices at-hand.

5) Smart visualization and interfaces

The modality of data delivery is another point that has been painstakingly improved within the past decade. EHS software blends the collected EHS data and presents it on interactive dashboards. A value based content visualization that is also available as per user-configuration. This enhances reception and response from the EHS personnel and for the point-of-contact workers, monitoring the indicated metric in question.

Due to the demanding nature of industrial work, such representation attaches significance via highlighting information rather than letting the worker search through dynamic data to retrieve time-sensitive information.

The other aspect accentuated by this method is the focus on tackling lagging indicators that might hide behind 'favourable data'.

6) External ecosystem

A slightly bolder yet proven approach is to let industry leaders and even open initiatives take charge of the EHS data and let them develop a system specific for the industry or facility.

This is a proven approach due to the vast majority of specialist organizations helping industries find their way on the road to securing a suitable EHS software.

Not only is the expertise available on-demand but the time and energy saved during the software development and implementation process helps industries find their footing before taking the digital leap.

The EHS 'thinking and crafting' is already ensured and all the institution needs to exercise is governance surrounding its implementation and the complementing support services.

7) Talent and culture

Digital has the innate principle of "fail-first" meshed within its design. Similar to the core value that is considered absolute for a functional EHS ecosystem.

This allows the EHS software to indicate clearly which of the crucial components or metrics might go off the rails, first.

Such insight is of great value to EHS supervisors who are trained and willing to stop operations, instead of allowing erroneous processes to go on and accumulate to become a massive failure at the end.

EHS software allows collaboration at a better level than it was possible before. By identifying and reporting non-compliant operations, the worker and EHS supervisor relationship is strengthened through confidence in the systems they use, respectively.

Issues against EHS automation

There are some interesting challenges that “digital” faces at organizations. The paradox of the situation lies in the fact that some of these challenges seem equivocal.

The issues that can mar and affect the implementation and performance of EHS software are:

- Legacy IT systems
- Lack of quality/accessible data
- Culture and talent
- Complex organizational structure
- Burden of regulations and compliances
- Senior management mandate

Older systems and platforms within industrial environment, to date, remain as archetypal problems. This is due to the fact that they not only yield data too easily making them unsecure, thus open to attacks. But also due to the fact that their presence depreciates the chances of newer and better technology to find its way, into the hands of the workers.

Clever initiatives require intelligent tools and legacy systems aren't compatible even with the most updated/patched software that are currently on offer.

Another issue that surrounds EHS software implementation is lack of clean and accessible data in order to generate master records. This data shapes the first-built hierarchies for software that will serve as the architectural template for the rest of the development. Sometimes, industries can find itself faced with the dilemma of admitting that their record keeping just isn't up to the mark. Thus affecting the quality and accessibility of EHS data that is supposed to build the foundations of a digital EHS ecosystem.

*“It is not the strongest
of the species that
survives, nor the most
intelligent that survives.
It is the one that is the
most adaptable to
change.”*

Charles Darwin

Culture and talent are like two-sides of the same coin. However, in this particular case, either side means a loss to the EHS digitization mandate. Change requires a certain degree of flexibility and a state of mind that influences an organization in to believing. Entrusting their occupational faith on a new system about which they may have little to no understanding. A cocktail of this with already demanding responsibilities at work means a lackadaisical approach to EHS software.

Talent, the other face of the coin, resembles the out-and-out achievements that has come to define the safety DNA of the organization. Individuals who were instrumental in making this pursuit achievable may feel challenged and threatened. Automation is here to claim their jobs.

47% occupations in advanced economies are at the 'high risk' of being automated

Frey and Osborne, "The Future of Employment: How susceptible are jobs to computerization" Oxford Martin School.

Complex organizational structures are inherent to large organizations. The cross-team permissions and interplay of responsibilities is often labelled as an employee's "decision-making" nightmare. How can then a small team of EHS supervisors convince their counterparts that a new digital EHS software is the right call?

Escalating to the senior management which may have little to no-time for untested and sometimes even unknown solutions. Their own research throws up at least ten different solutions that might help them realize a more than satisfactory EHS performance.

And as the organization's hierarchy grows and branches the main question of regulatory and compliance burden grows exponential. Making its presence felt due to shroud of doubt that envelopes the key decision makers within a complex organization.

The path of undertaking such a digital risk seems inundated with issues. Issues that can prevent the industries from making decisions that may favour their EHS vision and performance in the longer run. Resisting change has been cited in countless institution surveys across several different domains as a key challenge, recurrent and stubborn.

However, the most accommodative aspect of EHS software remains its adaptability to the customer's EHS ecosystem. So it adjusts and aligns according to the needs and demands of the organization rather than the other way around.

Automation supersedes traditional

Prior to the use of EHS software, EHS monitoring and maintenance employed a retrospective approach to its compliance and safety domain. The operations and production floor supervisors had reported and observed safety guidelines, when something went wrong.

However, in most cases, the issue doesn't simply lie within the "observe and report" structure. It arises from the lack of definitive reporting systems. Lack of systems which can encompass: reporting, documentation and reference data at-hand. On a similar note, systems which can assist in inspection, observations and audits were not available. Leaving a performance gap between observations and their reporting.

Establishing an effective EHS program also needs a superior EHS software. Here are the three key factors that can lead to establishing a mature EHS model:

- 1. Governance**
- 2. Assurance**
- 3. Digital systems**

The questions to consider when laying light on these aspects are necessary to ask in the same manner, digitization is necessary for binding the EHS challenges together.

1) Governance

This aspect describes the nearness of the workforce and management in terms of their alignment towards organizational EHS aspirations.

- Do the leaders possess appropriate skills in order to make the workforce aware of common EHS goals?
- Do the workforce understand or are aware of the EHS performance that is being proposed?
- Is there a clear governance structure outlining the roles and responsibilities of the new EHS plan?
- Is there a proactive communications plan in place prior to implementation of the EHS software?
- Is there a detailed plan of possible outcomes and achievable goals the organization wants to secure?

2) Assurance

This factor outlines the responsibilities and duties which the organizations aspires to implement under the digital EHS.

- Does your organizations have an effective way to assess threats and mitigate risks through a defined “line of defence”?
- Does the organization have a well-defined governance and assurance structure, looking after the EHS program?

3) Digital systems

Newer technology and its adoption isn't a straightforward process, unless organizations show initiative and make the path well-defined and understandable for its workforce.

- Have you defined your EHS goals in context of a digital solution: reporting, needs, safety performance etc.?
- Is the data delivery and storage secure and made accessible at locations, as per your needs?
- Can the workers adopt this system with little to no training or special training with time-off work would be required?

The semblance of efficient EHS workflows and performance can be delivered by EHS software.

It ensures **process uniformity** that is necessary in industries being applied at several sites at once. The EHS personnel and workforce receive a clear-cut idea of their EHS duties and responsibilities within same framework, respectively.

User adoption remains high due to the similar or an adapted workflow on offer by the EHS software. The 'touch-and-the-feel' remains similar to what the workforce is accustomed at using. However, safety receives the priority treatment through checklists, digital forms and proactive tools that enable workforce and EHS personnel to raise their EHS monitoring by several factors.

Compliance with requirements is fulfilled as the software is compliant with the country, industry and the domain laws. Vendors with in-house EHS experts can outshine other software company's due to their knowledge and experience of implementation. This not only offers you an adept tool to be deployed but with the option that it can be altered as per your EHS ecosystem and workflows.

The **data control** and purpose this provides to the EHS data being generated and collected is superior to traditional EHS management systems. The information flow-through is visible to the organization in its entirety as per the EHS governance structure. And as the data percolates and moves through the system it leaves behind the trail of relevant EHS information.

Providing a **real-time visual scenario** live to the EHS personnel instead of relying on the delayed paper trail. Or, tabulated sheets that only display a part of the information.

This opens up the **EHS performance** to take a free run enabled by key insights delivered on-time. This streamlined EHS data prepares the organization to chart a wider EHS strategy. This can be applied across several sites or be used even at location not within the boundaries of the existing one. The shape and workflow adjusts and aligns as per the location and geography. Without alterations being required to a tested workflow and its implementation.

Ushering the digital era for EHS

A new hub for the knowledge based world order is emerging – Asia.

There has been a consistent 6-7% increase in the R&D expenditure from the two major industrial powerhouses within the region.

According to a stat by Global e-sustainability initiative and Boston Consulting Group "ICT-enabled solutions offer the potential to reduce GHG emissions by 9.1 Gigatons by the year 2020".

And in its sharp contrast stands the figure taken from World Bank report³ which states the developing countries would be spending 70 to 100 billion dollars each year during 2050 to combat climate change.

The starkest 'super-challenge' would be posed by the amalgamation of all such challenges posed by climate change interspersed with the rising occupational health and safety issues.

EHS software can uplift the upkeep, maintenance and vigilance aspects of operations found within diverse sector and streams of industries.

The core challenges, risks and issues surrounding the EHS software have been discussed. We have also detailed the direct and aggregated benefits delivered by implementation of such solution.

The next step offers a quick glimpse into the **transformation process**.

Followed by a look at the **3 areas** which can architect, robust EHS and sustainability domain.

This also explains the **business benefits** and traits to explore in the **market solutions** when looking for EHS software.

Transformation process in ideal case should be able to illustrate and chart your course across the map of digitization for EHS. The process starts with the step of **selection**. Selection earmarks the stage of choosing and selecting a vendor to become the partner in EHS software pursuit.

This is layered within two affine stages that interplay and require the inputs from one another until the finalization of the vendor. As we mentioned earlier, experienced EHS professionals matched with skilled software and IT team can undertake the vendor process for organizations of any size.

The second layer within selection is about understanding the quality of EHS data that is available. Understanding the degree of freedom and transparency that would be necessary for the vendor to develop and calibrate an EHS software.

Once these two-layers are found to be compatible to the required degree of confidence, the process can kick-off to the next stage.

Designing of an EHS software may spell a dictum for the performance of the EHS activities that populate the ecosystem. Design process should be based on a thorough requirement analysis with possible vetting procedures, if there are third party or independent auditors, available. The gist of this process lies in aligning the realm of EHS ecosystem with the product that will enable it once the design is approved. The nature of data should be validated and verified which may even require spatial maps and location summary for large or multiple-location sites.

Vendors ask the questions while organizations should feel compelled to ask and demand clarity. Design stage is where most of EHS processes will be adapted and assimilated within the software. A small error here can result in a glaring mistake later. This process also involves determining the level of resource allocation and as to 'how far the EHS digital net should be casted'.

Ensuring a close relationship in terms of data sharing, organizational EHS vision and the facility facts can prove to be a rewarding point later.

However, there are incidences where the organization either had a minimal EHS setup or is in the process of taking a tectonic shift from its original processes. For such cases, the handholding process during designing and later afterwards (post-deployment) becomes paramount.

If organizations know and are aware of such a move, it cannot be stressed enough to entrust the responsibilities of EHS software with a vendor with in-house EHS expertise. It would prove to be the simplest way of EHS knowledge transfer without being overcharged for functional intelligence and receiving a stable software product.

Post-design and creation of a software environment that can encompass the EHS demands, comes the process of **implementation**.

From this point forward, the organization needs to grasp the value of time-efficient training and understandability. With EHS software that has been configured and designed in accordance with the latest EHS and industry norms, compliances and regulations. Realizing its true potential falls onto the frontline workers, EHS personnel and the management.

A clear-cut understanding of EHS governance feeds into this process from earlier. The EHS software is now configured within the project sites, distributed via cloud to handheld devices. Pilot runs are conducted to effectively check the response and data feedback which is being generated on sometimes live sites.

Pilot runs and system testing allows the vendor to effectively test for bugs and issues which a live system might encounter. It also provides the right template to the workers who would need sometime before they can adjust and embrace to a new system.

Training modules for workforce targeting use, response and field demonstration become necessary in day to day industrial environments. Especially, in the case of offsite locations like offshore complexes and remote construction or power generation sites: app-enabled mobile solutions with offline capabilities is seen as a game-changer.

However, in modern day scenarios with excellent vendors, the process is executed with affirmative goals and their learnings in sight. Data behavior from inherent EHS and operations' data also serves as a pointer for the organization to help them orient towards the new system.

The next stage marks the process of **deployment**. This is a full-fledged effort to switch from the conventional EHS systems to the EHS software, designed and implemented as per the organizational requirements.

The complete deployment scenario is agreed upon within the vendor-organization agreement and is a formal way to push the newly minted boat to test the waters.

The EHS software starts taking the complete load of the EHS ecosystem with reporting, observations and actionable directives being issued from within it. The legacy systems are retired and their transient data is distributed across the new EHS software storage or repository.

Legacy data has a unique way of offering insights as it is the only option available to some organizations to gain a tangible grasp over their old EHS systems. Vendor negotiations can be useful in bargaining for digitizing legacy datasets and their integration.

It is a service which not many vendors are too keen on. However, within the scope of contract and future business pursuits, organizations can pitch a legacy data retrieval and storage process. Offering legacy data aware manpower at-hand to help the vendors undertake the work within the designing and implementation phase itself.

Legacy data can offer the organization an older yet still relevant baseline. This baseline serves as the reminder of the older system and the data it aggregated. While the new EHS software churns away for a year or so and its baseline data can then be pitted against the older one.

This “versus” exercise would yield insights. It may not necessarily be good or poor but would offer a new level of confidence to the EHS personnel to compare the growth in confidence within the EHS ecosystem of its workforce or even contracted manpower.

Performance delivery from EHS software

3 areas which can architect, robust EHS and sustainability domain via EHS software⁴



Source: ES-DATA, Environmental, health, safety (EHS) and Sustainability – Data Analytics and Technology Advisory Services

Purpose of holistic EHS

The impact of a performance oriented EHS software can be summarized within these three key points

- Business and commercial
- Social
- Legal

The business and commercial sense made by an EHS software sees cost reduction. It makes the EHS workflows more time efficient. This enhances the productivity and with more money to show on balance sheets with a proactive approach on safety. Reputation and brand image takes a soaring course with the influence of better managed operations becoming more identifiable.

Social values are strengthened through safer operations. The workforce bond and better understand each other due to less stress while at workplace. The EHS governance aspect receives a shot in the arm due to trust among the workforce.

Legal compliance is the assured return on the EHS software wager. The operational risk and risk management are pinned on reliable systems. While vigilance, monitoring and reporting become instantaneous. This adhesion of safety between each system and their drivers keeps an affirmative check on the legal aspects.

Organizations need to understand the need for moving towards a mature EHS model. The overarching EHS governance and its pillars within rely on each other through good reporting and communication.

And EHS software provides this aspect the biggest facelift than any other safety management system. The modern day workplace needs to offset and manage operational risk. It needs to maintain a superior safety track record which involves its employees and machinery.

Finally, efficient systems with good reporting platforms are being demanded, increasingly.

EHS software are the secure models to implement a proactive EHS program. Whether it is providing an uplift to the existing framework or foundations for a newly propose program. EHS software with their different modules for safety, health and environmental monitoring can set organizations on a reliable and well-defined path.

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