Profile

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Content & Objective of Session

- Importance of IA
- Role of Internal Auditor – Manufacturing Units
- IA – Detective to Preventive Control
- Risk Based Internal Audits (RBIA)
- Process study – Control analysis
- EWS – Various Depts - Developing EWS - Illustrations

- Value Addition through Internal Audits – Action Taken Reports
- Moving from Detective controls to Preventive controls
- Moving from MIS report based post-mortem detective controls to RBIA Dash Board EWS alerts based Descriptive Analysis, Diagnostic Analysis, Predictive Analysis, Prescriptive Analysis, Cognitive Analysis
- System integration of live data

1. Strengthen SAP to Focus Data integration   Sample Reporting

| Risk Rating | 🔴 | High | 🟡 | Medium | ✅ | Low | Root Cause | 🟪 | D | 🟦 | O | ☑ | S | Implication | 🟩 | B | ☑ | A |

Background

Wholesale and online Sales / sales returns are being captured in SAP and the same will be integrated from SAP to Focus once/twice in a week by the Focus consultant through Manual Programming.

Observation

On reconciliation of Wholesale and Online Sales / Sales Returns data as per SAP and Focus, we observed that the there are few instances, where sale quantity and sale value as per SAP are different from Focus. Details are as per **Annexure-4.**

Root Cause

• Data integration through Manual Programming

Risk and Impact

• Due to the absence of correct integration of data from SAP to Focus, the closing stock valuation can get impacted as the closing quantity differs from the actual quantity.
• Extra work and time to be allocated on Reconciliations by the team to rectify the deviations from one system to another system

Action Plan

Person Responsible: XXXXXXXXXXXXXXXX)   **Timeline for Implementation:** DD/MM/YYYY

Management Comments

We have been taking utmost care in ensuring the correctness of the records. However, there are insignificant errors occur occasionally. We will prevent the recurrence of such mismatches in future.

The management has taken decision to re-implement SAP so that these issues will not arise and once the re-implementation is done, only SAP and TPOS will exist and both will be integrated via API without any manual intervention.

Recommendation

Automatic Programming to be implemented for data integration of SAP with Focus and current practice of Manual Programming of the same shall be suspended.

Internal Audit

- "Internal audit is an independent management function, which involves a *continuous* and critical appraisal of the *functioning of an entity* with a view **to** *suggest improvements thereto* and *add value* to and strengthen the overall *governance mechanism* of the entity, including the entity's strategic *risk* management and *internal control system*. Internal audit, therefore, provides assurance that there is transparency in reporting, as a part of good governance".

- As of today, internal audit undeniably is the backbone of a sound *corporate governance system*

What are Internal Controls?

- As per Explanation to clause [e] of sub-section (5) of section 134 - Financial statement, Board's report, etc. of Companies Act, 2013 :–

- Internal financial controls means the policies and procedures adopted by the company for ensuring the
  - orderly and efficient conduct of its business, including adherence to company's policies,
  - the safeguarding of its assets,
  - the prevention and detection of frauds and errors,
  - the accuracy and completeness of the accounting records, and
  - the timely preparation of reliable financial information;

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Internal Controls (ICs) are essentially risk mitigation steps taken to strengthen the organization's systems and processes, as well as help to prevent and detect errors and irregularities.

When Internal Controls (ICs) mitigate the risk of financial exposure = Internal Financial Controls (IFCs)

Procurement to Pay, Order to Cash, WBS, MM, EWM,-SCM, Inventory Management, Fixed Assets, FICO,

Preventive, Detective, Corrective, Compensative

When ICs, in an automated environment, computer controls are deployed to secure the systems = **IT General Controls/System Controls**

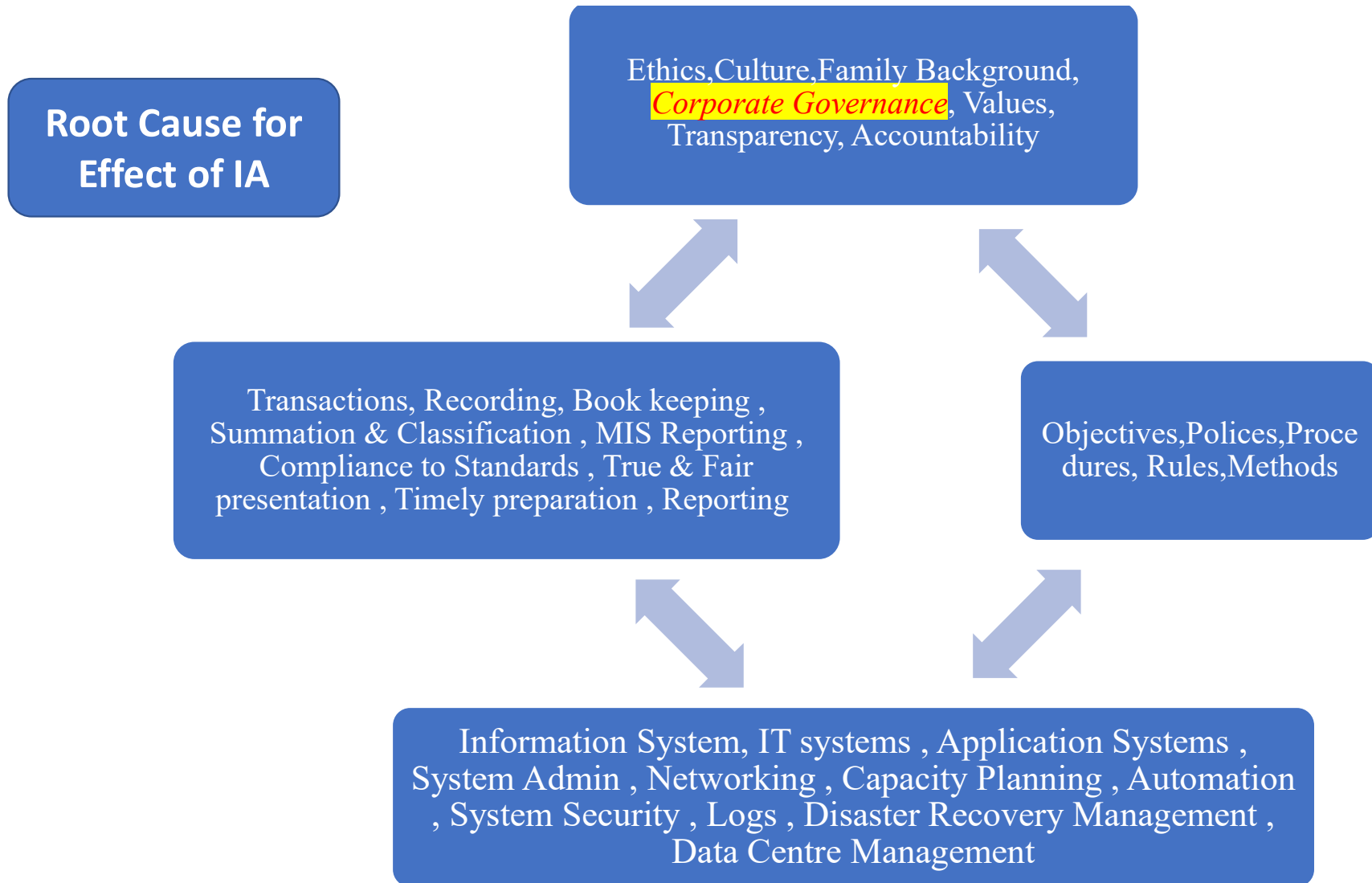When ICs mitigate operational risks = Operational Controls (OCs)

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Different Types of Controls

- Types of Internal Controls are:

- **Preventive Controls**: They attempt to deter or prevent undesirable acts from occurring.

- **Detective controls:** They attempt to detect undesirable acts.

- **Corrective Controls**: They are typically those controls put in place after the detective internal controls discover a problem.

- **Compensating Controls**: It is a mechanism that is put in place to satisfy the requirement for a security measure that is deemed too difficult or impractical to implement at the present time.

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Root Cause for Effect of IA

Ethics, Culture, Family Background, *Corporate Governance*, Values, Transparency, Accountability

Transactions, Recording, Book keeping, Summation & Classification, MIS Reporting, Compliance to Standards, True & Fair presentation, Timely preparation, Reporting

Objectives, Polices, Procedures, Rules, Methods

Information System, IT systems, Application Systems, System Admin, Networking, Capacity Planning, Automation, System Security, Logs, Disaster Recovery Management, Data Centre Management

Objectives Polices Procedures - Rules - Methods	Ethics Culture Family Background Corporate Governance Values Transparency Accountability	Transactions Recording Book keeping Summation & Classification MIS Reporting Compliance to Standards True & Fair presentation Timely preparation Reporting	Information System IT systems Application Systems System Admin Networking Capacity Planning Automation System Security Logs Disaster Recovery Management Data Centre Management	Environment Legal System Political system Cultural system Economic System Global integration Bureaucratic system

Why Controls - Prevention/Detection of fraud/error, Compliance, Protection of asset

What Controls - Preventive, Detective, Corrective, Compensative – Manual/System based

Whose Baby – Shareholder/BOD/CM/MD/CFO/CEO/Management/Staff

Role of Internal Auditor

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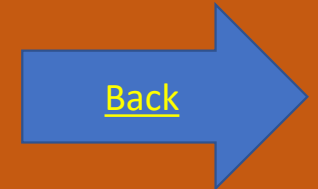
Layers of Protection

Corporate Governance – 1st Layer

- Ethical Culture
- Tone at the top
- Well established SOPs
- Internal Controls

Internal Audits – 2nd Layer

- Scientific Scope
- Independent Execution as per Standards, Professional Scepticism
- Discussion of points without dilutions
- Audit Committee Seriousness in Implementing valid suggestions
- Action Taken Reports

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Layers of Protection

Statutory Audits – 3rd Layer

- Independent Execution as per Standards, Professional Scepticism
- Audit Committee Seriousness in evaluating Auditor's Performance

Forensic Audits – 4th Layer

- Independent Execution as per Standards, Professional Scepticism
- Audit Committee Seriousness in evaluating Auditor's Performance
- Competence of Legal Team
- Evidences gathered
- Enforceable contracts
- Effective coordination among various departments in legal adjudications

Provisions under Companies Act, 2013

Responsibilities of Management as per Companies Act 2013

- As enumerated under Sec 134(5) of Companies Act, 2013("Act") , the **Directors Responsibility Statement** shall include a declaration from Director that internal financial controls to be followed by the company and that such **internal financial controls** (IFC) are adequate and were operating effectively.

- **Provisions under the Companies Act 2013 for IFC:**

- **1. Section 134 of the Act**

- In case of Listed Companies, Directors responsibility statement states that IFC shall be followed by the company and all the IFC are adequate and were operating effectively.

- **2**. **Section 143 of the Act**

- Pursuant to Sec 143(3) (i) has stated that the Auditors report shall state whether the company has adequate IFC system in place and the operating effectiveness of such controls.

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General Early Warning Signals

- Fire Alerts
- Weather bulletin
- Health symptoms

Early Warning Signals in Recession, Natural Disasters and Pandemic

Indicators of EWS are as below:

Recession	Natural Disasters	Pandemic
Decline in demand for products or services	Weather alerts and warnings	Increase in infection rates
Reduction in consumer spending	Supply chain disruptions	Imposition of travel restrictions
Rise in unemployment rates	Facility damage and power outages	Supply chain disruptions
Decline in GDP growth rate	Employee safety concerns	Facility shutdowns
Increase in inventory levels	Community impact	Employee safety concerns
Increase in inventory levels		Changes in consumer behaviour
Measures to be Taken		
To monitor these indicators and take proactive steps to **reduce costs**, adjust production levels, optimize inventory management, and diversify their customer base.	To monitor these potential risks and **develop contingency plans** to ensure the safety of their employees, protect their facilities and equipment, and maintain production levels.	To monitor these indicators and develop contingency plans and **adjust their operations to minimize the impact of these events** on their business, employees, and customers

Value addition in IA – Moving away from routine matters

Internal audits play a crucial role in ensuring the smooth functioning of manufacturing units.

Key Reasons	Importance
Compliance with regulations and standards	Internal audits help ensure that the organization is complying with the regulations/standards those related to product safety, quality, and environmental impact and avoiding penalties or fines
Identification of potential risks and hazards	Internal audits can help identify potential risks and hazards related to product quality, safety, and environmental impact. This can help prevent incidents such as product recalls or environmental spills, which can be costly and damaging to the organization's reputation.
Improving operational efficiency	Internal audits can identify areas where processes can be streamlined or made more efficient. This can lead to cost savings, improved productivity, and better use of resources.
Enhancing product quality	Internal audits can help identify quality issues and provide recommendations for improvement. This can help improve customer satisfaction and loyalty, as well as the organization's reputation.
Preventing costly recalls and product liability claims	Internal audits can help identify potential quality issues before they lead to costly recalls or product liability claims. This can help protect the organization's financial stability and reputation

Value addition in IA – Moving away from routine matters

There are several types of audits that help manufacturing units to ensure that their operations are efficient, effective, and compliant with relevant regulations and standards, and that their products are of high quality. The specific types of audits conducted may vary depending on the organization's needs and priorities.

Type of Audit	Area of Focus	How is it conducted
Process Audits	These audits focus on specific manufacturing processes to ensure that they are efficient, effective, and comply with regulations and standards.	Process audits may include a review of process documentation, observation of the process in action, and analysis of process data.
Compliance Audits	Compliance audits focus on ensuring that the organization is complying with relevant regulations, standards, and internal policies and procedures.	Compliance audits may include a review of documentation, observation of practices, and interviews with employees
Product Audits	These audits focus on the quality of the final product, including its design, production, and delivery.	Product audits may include a review of quality control processes, inspection of products, and analysis of product data.
Quality Management System (QMS) Audits	QMS audits focus on the organization's quality management system, which includes policies, procedures, and processes for managing quality.	QMS audits may include a review of documentation, observation of practices, and analysis of data related to quality management

Value addition in IA – Moving away from routine matters

Type of Audit	Area of Focus	How is it conducted
Safety Audits	These audits focus on ensuring that the organization's safety procedures and practices are in compliance with applicable regulations and standards	Safety audits may include a review of documentation, observation of practices, and interviews with employees
Environmental Audits	Environmental audits focus on ensuring that the organization is in compliance with environmental regulations and standards	These audits may include a review of documentation, observation of practices, and analysis of data related to environmental impact.
Financial Audits	Financial audits focus on ensuring that the organization's financial systems and controls are effective and in compliance with relevant regulations and standards	These audits may include a review of financial records, interviews with financial personnel, and analysis of financial data
Information Technology (IT) Audits	IT audits focus on ensuring that the organization's IT systems and controls are effective and in compliance with relevant regulations and standards	These audits may include a review of IT policies and procedures, observation of IT practices, and analysis of IT data

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Internal Audit - Benefits

➢ **Improved Quality control**

Internal audits ensure that manufacturing processes meet quality standards and identify areas for improvement

➢ **Risk Mitigation**

Internal audits identify potential risks and provide recommendations to mitigate them, reducing the likelihood of operational disruptions and financial losses

➢ **Cost Savings**

Internal audits identify inefficiencies and waste, leading to cost savings through process improvements and resource optimization.

➢ **Knowledge Sharing**

Internal audits provide an opportunity to share knowledge and best practices across departments and teams, increasing collaboration and innovation.

Early Warning Signals?

➢ Early warning signals are indicators or signs that suggest potential risks or problems within an organization.

➢ These signals are typically identified through data analysis, observation, or other forms of monitoring.

➢ Early warning signals can provide advance notice of potential risks, allowing management to take proactive measures to mitigate or prevent the risks before they escalate into more significant issues.

➢ Early warning signals can be qualitative or quantitative and can be <u>found in various areas of the organization, including production, finance, human resources, and customer service</u>

Early Warning Signals?

➢ By focusing on early warning signals, manufacturing units can identify potential risks and take corrective action before they become major problems.

➢ This can help prevent production delays, reduce costs, and ensure customer satisfaction.

➢ *Internal audits can play a critical role in identifying early warning signals by reviewing data, processes, and systems to identify potential risks and vulnerabilities.*

<u>**Examples:**</u>

➢ Increased customer complaints

➢ a rise in employee absenteeism or turnover

➢ declines in product quality or efficiency

➢ financial fluctuations

➢ changes in supplier or vendor performance

➢ Quality control issues

➢ Equipment breakdowns or failures

➢ Non-compliance with regulations or standards etc…

Early Warning Signals - Examples

➢ **Decrease in Productivity**

An unexpected decrease in productivity could be an EWS of a larger issue in the manufacturing process.

➢ **Increased Waste**

An increase in waste could indicate inefficiencies in the manufacturing process or potential equipment issues

➢ **Rising costs**

A sudden increase in costs could be a sign of supply chain issues or equipment malfunction.

➢ **Wasteful Material Usage**

Using too much raw material. Overstocking or not properly rotating inventory and not recycling or reusing materials where possible.

Early Warning Signals - Examples

➢ **Inconsistent or incomplete documentation**

This may indicate poor record-keeping practices or intentional concealment of information

➢ **Excessive waste or scrap**

This may be a sign of poor production processes, inadequate quality control, or even theft.

➢ **Inadequate training or supervision**

This may result in unsafe work practices poor quality output or non compliance with regulations

➢ **Unexplained inventory discrepancies**

This may signal theft, inaccurate record-keeping or poor inventory management

Importance of Early Warning Signals

Early Warning Signals provide advance notice of potential risks	**Early warning signals can improve compliance**
This enables proactive measures to be taken to prevent or mitigate the impact of the risk	By identifying potential non-compliance issues, early warning signals can improve adherence to regulations and prevent fines or legal action
Early Warning Signals can identify systematic issues	**Early warning signals can improve overall performance**
This information can be used to improve processes and prevent future occurrences	By identifying potential issues early on, manufacturing units can make adjustments to improve efficiency and productivity

Internal Audit and EWS - Preventive or Detective?

Internal Audit	Early Warning Signals
Internal audit can be both preventive and detective	EWS are primarily a preventive measure
As a preventive measure, internal audit can identify potential issues and provide recommendations for improving controls and processes to mitigate risks before they occur.	By detecting EWS, organizations can take proactive measures to address potential issues and prevent them from becoming major incidents
As a detective measure, internal audit can also identify issues that have already occurred and provide recommendations for corrective actions to mitigate the impact and prevent similar issues from occurring in the future	However, it is worth noting that EWS can also serve as a detective measure if they are not detected early enough. In such cases, EWS can help detect the issue early on and enable the organization to take corrective actions to minimize the impact of the issue.

Common Departments in Manufacturing Units

Production Department:
- Responsible for the actual manufacturing process, including the assembly, fabrication, and processing of products.

Quality Control Department:
- Responsible for ensuring that the products manufactured meet the required quality standards through testing, inspection, and auditing.

Engineering Department:
- Responsible for the design and development of products, equipment, and processes to improve efficiency and quality.

Research and Development Department:
- Responsible for researching and developing new products and technologies to improve the manufacturing process and stay ahead of competitors.

Supply Chain Department:
- Responsible for managing the sourcing, purchasing, and delivery of raw materials and components needed for the manufacturing process

Common Departments in Manufacturing Units

Human Resources Department	• Responsible for managing employee recruitment, training, and development, as well as ensuring compliance with labor laws and regulations.
Finance Department	• Responsible for managing the financial aspects of the manufacturing unit, including budgeting, forecasting, and financial reporting.
Maintenance Department	• Responsible for maintaining and repairing equipment and machinery to ensure that they operate efficiently and safely.
Environmental Health and Safety Department	• Responsible for ensuring that the manufacturing unit complies with environmental and safety regulations, and that employees are provided with a safe working environment.
Information Technology Department	• Responsible for managing and maintaining the IT infrastructure, hardware and software systems, cybersecurity, data storage and analysis, and providing technical support to other departments in the organization

Practical Examples of EWS in Production Department

➢ **Increase in defect rate**
An increase in the number of products that fail to meet quality standards could be an EWS

➢ **Increase in downtime**
A sudden increase in the amount of downtime required for maintenance or repairs may indicate that equipment is aging or failing, which could lead to further production disruptions or quality issues.

➢ **Increase in rejected products**
If the number of products that fail to pass quality inspections increases, this may indicate a problem with the manufacturing process that needs to be addressed.

➢ **Decrease in production output**
If there is a sudden decrease in the amount of products being produced, it may indicate issues with equipment, staffing, or the manufacturing process.

Illustration-1 of EWS in Production Department

A. Let's consider the following data set for a production department in a manufacturing unit:

Date	Shift	Production Volume	Scrap Rate (%)
01-05-2023	1	1000	1.5
01-05-2023	2	1200	1.2
02-05-2023	1	950	1.8
02-05-2023	2	1150	1.5
03-05-2023	1	980	1.6
03-05-2023	2	1100	1.4
04-05-2023	1	910	2
04-05-2023	2	1050	1.6

➢ In this example, we can use the production volume and scrap rate data to identify early warning signals in the production department.
➢ To start, we can calculate the average daily production volume and scrap rate for each shift:

Shift	Avg. Production Volume	Avg. Scrap Rate (%)
1	962.5	1.725
2	1125	1.425

B. Now, set thresholds for each metric based on historical data or industry standards.

Production volume threshold	5% decrease from the average daily production volume
Scrap rate threshold	10% increase from the average daily scrap rate

Using these thresholds, we can identify any deviations from the expected values as early warning signals.

C. Identify EWS: For Example
✓ If we observe a shift with a production volume lower than 5% of the average daily production volume, it could indicate a potential issue that needs to be investigated.
✓ Similarly, if we observe a shift with a scrap rate higher than 10% above the average daily scrap rate, it could be an early warning signal for a potential quality issue.

Illustration-1 of EWS in Production Department

D. Data Analysis of the above table after setting Threshold limits to identify EWS, if any

Date	Shift	Production Volume	Daily Average Volume	% of increase or decrease from Average	EWS	Scrap Rate (%)	Daily Average Scrap Rate	% of increase or decrease from Average	EWS
01-05-2023	1	1000	962.5	4%	No	1.5	1.725	-13%	No
01-05-2023	2	1200	1125	6%	No	1.2	1.425	-16%	No
02-05-2023	1	950	962.5	-1%	No	1.8	1.725	4%	No
02-05-2023	2	1150	1125	2%	No	1.5	1.425	5%	No
03-05-2023	1	980	962.5	2%	No	1.6	1.725	-7%	No
03-05-2023	2	1100	1125	-2%	No	1.4	1.425	-2%	No
04-05-2023	1	910	962.5	-6%	Yes	2	1.725	16%	Yes
04-05-2023	2	1050	1125	-7%	Yes	1.6	1.425	12%	Yes

❑ From above analysis, we can see that the production volume for shift 1&2 on 04-05-2023 is below the threshold, indicating a potential issue.
❑ We can also see that the scrap rate for shift 1&2 on 04-05-2023 is above the threshold, which could be another early warning signal.
❑ These early warning signals can then be further investigated to identify the root cause of the issue and take corrective actions to prevent any major quality or safety incidents.

Illustration-2 of EWS in Production Department

To monitor the production process and identify any early warning signals, Production Team can use a checklist to track the progress of the production process and identify any deviations from the expected standards. Below is the sample:

Production Process Step	Expected Standard	Actual Result	Deviation from Standard	EWS Trigger
Raw Material Inspection	No defects	2 defects	Yes	Yes
Mixing Process	Mixing time: 10 min	Mixing time: 15 min	Yes	Yes
Temperature Check	Temperature: 100°C	Temperature: 105°C	Yes	Yes
Quality Control Check	All products pass	2 products fail	Yes	Yes
Packaging Process	No defects	1 defect	Yes	Yes

❖ In this example, the checklist outlines the expected standards for each step in the production process and compares them to the actual results.
❖ If there is any deviation from the expected standard, an EWS trigger is activated to alert the production team to investigate the issue and take corrective action.
❖ By using this EWS checklist, the Production team can proactively identify any potential quality issues and take corrective action before they result in major quality or safety incidents.

Practical Examples of EWS in Quality Control Department

➤ **Increase in product recalls**
If there is an increase in the number of product recalls due to quality issues, it may indicate a problem with the manufacturing process or the quality control measures in place.

➤ **Increase in customer complaints**
If there is an increase in the number of customer complaints about product quality, it may indicate a problem with the manufacturing process or quality control procedures

➤ **Decrease in inspection effectiveness**
If the quality control department is not able to catch defects or variations in products, it may indicate that the inspection procedures need to be improved

➤ **Inconsistent quality assurance practices**
Failure to adhere to established quality control procedures can result in inconsistent product quality, leading to customer complaints and reduced sales.

Illustration-1 of EWS in Quality Control Department

Assume a manufacturing unit produces 10,000 units of a certain product per month. The Quality Control department is responsible for testing a random sample of the finished products each month to ensure they meet the required quality standards. Let's say the acceptable defect rate is 1%, which means that up to 100 defective units are allowed per month.

The data sets for the past six months show the following results:

Month	Total Units Produced	Units Tested	Defective Units	Defect Rate for units tested
Jan	10,000	1,000	50	5%
Feb	10,000	1,200	80	6.70%
Mar	10,000	1,500	90	6%
Apr	10,000	1,300	100	7.70%
May	10,000	1,400	70	5%
Jun	10,000	1,600	120	7.50%

❑ From the above data sets, we can see that the defect rate has been steadily increasing over the past few months, reaching a high of 7.7% in April. This is an early warning signal that the Quality Control department should investigate the cause of the increase in defective units and take appropriate action to address the issue before it becomes a major quality incident.

❑ PO terms – Non compliance – penalty – Future PO terms

Practical Examples of EWS in Engineering Department

➢ **Increase in Equipment Failure**
If there is an increase in the equipment failures or breakdowns, it may indicate that the equipment is aging or not being maintained properly.

➢ **Decrease in equipment performance**
If the performance of the equipment decreases, it may indicate that the equipment is not working efficiently or effectively

➢ **Increase in energy consumption**
If there is an increase in energy consumption, it may indicate that the equipment is not running efficiently

➢ **Increase in downtime**
If there is an increase in the amount of downtime required for maintenance or repairs, it may indicate that the equipment is aging.

Illustration of EWS in Engineering Department

A). Let's say the engineering department is responsible for maintaining the production machinery in a manufacturing unit. The following are some key performance indicators (KPIs) that the department tracks:

A. Mean time between failures (MTBF) of machinery
B. Mean time to repair (MTTR) of machinery
C. Planned maintenance percentage (PMP) of machinery
D. Unscheduled downtime percentage (UDP) of machinery

B). Here's a sample data set for the above KPIs over the past six months:

Month	MTBF (hours)	MTTR (hours)	PMP (%)	UDP (%)
Jan	600	8	95	5
Feb	580	10	90	10
Mar	620	7	92	8
Apr	500	12	85	15
May	550	9	88	12
Jun	650	6	93	7

C). Based on the above data, the following EWS could be identified:

o If MTBF decreases significantly or falls below a certain threshold (say 500 hours), it could be an early warning of potential breakdowns and equipment failures. Component/Machinery Warranty – PO terms non compliance
o If MTTR increases significantly or goes above a certain threshold (Say 12 hours), it could indicate that the maintenance team is taking longer to repair machinery, which could lead to longer downtime and production delays.
o If PMP decreases significantly or falls below a certain threshold (Say 85%), it could indicate that the maintenance team is not performing enough preventive maintenance, which could lead to more breakdowns and unscheduled downtime.
o If UDP increases significantly or goes above a certain threshold (Say 12%), it could indicate that the machinery is experiencing more breakdowns and unscheduled downtime, which could impact production schedules and delivery timelines.

Practical Examples of EWS in R &D Department

➢ **Failure to meet project milestones**: If the R&D team is consistently failing to meet project milestones, it may indicate that there are issues with the project scope, resourcing, or execution

➢ **Decrease in innovation rate**: If the R&D team is producing fewer new ideas or innovations, it may indicate that the team is stagnating or that there is a lack of resources or support for innovation

➢ **Increase in time to market**: If the R&D team is taking longer to bring new products to market, it may indicate that there are issues with project planning, resourcing, or execution.

➢ **Increase in project costs**: If the cost of R&D projects is increasing, it may indicate that there are issues with project planning, execution, or resourcing

Illustration of EWS in R &D Department

Let's say a manufacturing company has an R&D department responsible for developing new products.
- The company has set a goal of launching at least one new product every quarter.
- The R&D department has a team of 10 researchers and a budget of Rs. 50,00,000 per quarter

Here's an example of how the EWS system can be used to detect potential issues

Particulars	Q1	Q2	Q3	Q4
Research spending (in Rs.)	40,00,000	45,00,000	55,00,000	60,00,000
Number of prototypes developed (in No's)	5	6	8	7
Success rate (in %)	80%	70%	60%	50%

Based on these numbers, the EWS system would flag the following potential issues:
- ❑ In Quarter 2, the success rate dropped to 70%, which is below the target of 80%. This could be a sign that the R&D team is struggling with a particular technology or approach, or that they are not adequately testing the prototypes before moving to the next phase of development.
- ❑ In Quarter 3, the research spending increased significantly, but the success rate dropped to 60%. This could indicate that the R&D team is not using the additional funds effectively, or that they are pursuing projects that are not well-aligned with the company's overall strategy.
- ❑ In Quarter 4, the success rate dropped to 50%, which is well below the target. This could be a sign that the R&D team is overstretching themselves or not focusing on the right areas.

Practical Examples of EWS in Supply chain Department

➢ **Increase in lead times**: If there is an increase in lead times for receiving raw materials or shipping finished products, it may indicate that there are issues with the supply chain, such as delays in transportation or problems with suppliers

➢ **Increase in inventory levels**: If there is an increase in inventory levels, it may indicate that there are issues with demand planning or forecasting, or that there are delays in the supply chain.

➢ **Increase in supplier issues**: If there are more supplier issues, such as quality issues, delivery delays, or price increases, it may indicate that there are issues with the supply chain or with the supplier management process

➢ **Increase in transportation costs**: If there is an increase in transportation costs, it may indicate that there are issues with the supply chain, such as delays or inefficiencies in transportation, or that there are problems with the carrier management process

Illustration of EWS in Supply Chain Department

A. Suppose a manufacturing unit sources raw materials from multiple suppliers.

- The Supply Chain department tracks the on-time delivery of these raw materials and the lead time between placing an order and receiving the material.
- The EWS in this case would be any significant delays or quality issues in the delivery of raw materials, which could impact production timelines and product quality.

B. Let's consider the following data set for one of the suppliers:

Order Date	Expected Delivery Date	Actual Delivery Date	Lead Time (Days)	Quality Inspection
01-01-2022	10-01-2022	18-01-2022	8	Pass
01-02-2022	10-02-2022	12-02-2022	2	Pass
01-03-2022	10-03-2022	18-03-2022	8	Fail
01-04-2022	10-04-2022	-	-	-
01-05-2022	10-05-2022	-	-	-

➢ In this data set, we can see that for the first order placed in January, the expected delivery date was January 10th, but the actual delivery was delayed by 8 days and the material passed quality inspection. For the second order placed in February, the actual delivery was 2 days earlier than the expected delivery, and the material passed quality inspection. However, for the order placed in March, there was a delay of 8 days, and the material failed quality inspection.

➢ By analyzing this data set, the Supply Chain department can detect early warning signals for any delays or quality issues with this particular supplier etc…

Practical Examples of EWS in HR Department

➢ **Increase in employee turnover**: If there is an increase in employee turnover, it may indicate that there are issues with employee engagement, job satisfaction, or the workplace culture.

➢ **Increase in absenteeism**: If there is an increase in absenteeism, it may indicate that there are issues with employee morale, job satisfaction, or workplace safety.

➢ **Increase in grievances**: If there is an increase in grievances, it may indicate that there are issues with workplace culture, communication, or management.

➢ **Decrease in employee performance**: If there is a decrease in employee performance, it may indicate that there are issues with employee training, job satisfaction, or motivation.

➢ **Untrained or unqualified personnel operating machinery**
Lack of training or certification can lead to improper use of machinery or equipment, which can lead to accidents or damage to the equipment.

Illustrations of EWS in HR Department

➢ Assume that the HR department of a manufacturing unit has identified high employee turnover as a potential risk to the organization.

➢ The HR department has set the following thresholds for each of these metrics as an early warning signal:
- ❑ Voluntary employee turnover rate: 10% increase from the previous period.
- ❑ Absenteeism rate: 5% increase from the previous period.
- ❑ Employee engagement score: 10% decrease from the previous period.

➢ The following table shows the data for the past four quarters for each of these metrics:

Quarter	Increase in Voluntary Employee Turnover Rate	Increase in Absenteeism Rate	Decrease in Employee Engagement Score
Q1	7.50%	3.20%	5%
Q2	9.10%	4.50%	17%
Q3	10.50%	4.90%	8%
Q4	12.20%	5.80%	28%

➢ Based on the above table, the HR department would have received an early warning signal in Q3&4 for the voluntary employee turnover rate, as it exceeded the threshold of a 10% increase from the previous period. Similarly, in Q4, the absenteeism rate increased by more than 5%, and for Employee Engagement Score also have triggered an early warning signal as in Q2&4 has increased by more than 5%

Practical Examples of EWS in Finance Department

➢ **Increase in accounts receivable aging**: it may indicate that there are issues with customer payments or that the company is extending credit to risky customers.

➢ **Increase in accounts payable aging**: it may indicate that there are issues with the company's cash flow or that the company is not paying its suppliers on time.

➢ **Decrease in profit margins**: If there is a decrease in profit margins, it may indicate that there are issues with the company's pricing strategy or that costs are increasing faster than revenue

➢ **Increase in operating expenses**: it may indicate that there are inefficiencies in the company's operations or that costs are increasing faster than revenue.

➢ **Increase in debt levels**: it may indicate that the company is taking on too much debt to finance its operations or that the company is not generating enough cash flow to meet its obligations

➢ **Decrease in cash reserves**: it may indicate that the company is not generating enough cash flow to cover its expenses or that the company is using its cash reserves to finance its operations

Illustration of EWS in Finance Department w.r.t. AP and AR

A) Assume a manufacturing company has the following data on their AR and AP balances:

Customer/ Supplier	Invoice Date	Due Date	Amount in INR
Customer A	Jan-01	Jan-31	10,000
Customer B	Feb-01	Feb-28	5,000
Customer C	Mar-01	Mar-31	7,500
Supplier A	Jan-15	Feb-14	6,000
Supplier B	Feb-15	Mar-14	3,500
Supplier C	Mar-15	Apr-14	5,000

B) The aging analysis of AR and AP can help identify potential issues with collections from customers or payments to suppliers. Let's assume the company has a payment and collection policy of 30 days. Therefore, the following aging buckets can

Aging Bucket	Time Frame
0-30 days	Current
31-60 days	1 month past due
61-90 days	2 months past due
Over 90 days	3+ months past due

C) Based on this aging buckets, the AR and AP balances can be analyzed as follows:

Aging Bucket	Customer A	Customer B	Customer C	Total
Current	10,000	0	0	10,000
1 month past due	0	5,000	0	5,000
2 months past due	0	0	7,500	7,500
3+ months past due	0	0	0	0
Total	10,000	5,000	7,500	22,500

Aging Bucket	Supplier A	Supplier B	Supplier C	Total
Current	0	0	0	0
1 month past due	6,000	0	0	6,000
2 months past due	0	3,500	0	3,500
3+ months past due	0	0	5,000	5,000
Total	6,000	3,500	5,000	14,500

D) From this analysis, the following insights can be gained:
•The total AR balance is 22,500, with 7,500 (33.3%) past due. This may indicate that the company is having difficulty collecting payments from its customers, which could lead to cash flow problems.
•The total AP balance is 14,500, with 9,500 (65.5%) past due. This may indicate that the company is not paying its suppliers in a timely manner, which could lead to strained relationships with suppliers or difficulty obtaining credit terms in the future.

Practical Examples of EWS in Maintenance Department

➢ **Increase in equipment downtime**: If there is an increase in equipment downtime, it may indicate that there are issues with equipment maintenance or that the equipment is reaching the end of its useful life.

➢ **Increase in maintenance backlog**: If there is an increase in maintenance backlog, it may indicate that the Maintenance department is not able to keep up with the maintenance needs of the manufacturing unit

➢ **Increase in equipment repair costs**: If there is an increase in equipment repair costs, it may indicate that the equipment is not being properly maintained or that the equipment is reaching the end of its useful life.

➢ **Lack of regular maintenance schedules:** Without regular maintenance, equipment can deteriorate, malfunction or even fail, which can disrupt production or cause accidents

Illustration of EWS in Maintenance Department

Assume a manufacturing unit has several pieces of equipment that are essential to the production process. Any downtime or unexpected repairs could result in a significant loss of production capacity and increased expenses. Therefore, it is critical to identify early

The below example is showing the metrics for each piece of equipment over a period of six months:

Equipment	Downtime (hours)	Repair Cost (Rs)	Maintenance Schedule Adherence (%)
A	10	50000	90
B	5	30000	95
C	20	100000	80
D	8	60000	92
E	12	80000	88
F	15	90000	85

Using this table, the manufacturing unit can calculate average values for each metric and set thresholds for early warning signals. For example:

1.Equipment downtime: The manufacturing unit can calculate the average downtime across all equipment and set a threshold that is a certain percentage higher than the average. For example, if the average downtime is 12 hours per week, a threshold of 15 hours per week could indicate an early warning signal.

2.Equipment repair cost: The manufacturing unit can calculate the average repair cost and set a threshold that is a certain percentage higher than the average. For example, if the average repair cost is Rs60000, a threshold of Rs75000 could indicate an early warning signal.

3.Maintenance schedule adherence: The manufacturing unit can set a target adherence rate for scheduled maintenance activities and set a threshold below that target. For example, if the target adherence rate is 90%, a threshold of 85% could indicate an early warning signal.

Practical Examples of EWS in Environmental Health and Safety Department

➤ **Increase in workplace injuries or illnesses**: If there is an increase in workplace injuries or illnesses, it may indicate that there are issues with safety protocols, training, or equipment.

➤ **Increase in near-miss incidents**: If there is an increase in near-miss incidents, it may indicate that there are issues with safety protocols, equipment maintenance, or employee behavior

➤ **Increase in safety violations**: If there is an increase in safety violations, it may indicate that there are issues with safety protocols, employee training, or communication.

➤ **Non-compliance with environmental regulations:** Failing to follow waste disposal and emissions regulations and not properly disposing of hazardous or toxic materials

Illustration of EWS in Environmental Health and Safety Department

Assume a manufacturing unit has the following data:

Metric	Current Year Data	Previous Year Data	Industry Data
Lost Time Injury Frequency Rate (LTIFR)	1.6	1.9	2.3
Total Recordable Injury Frequency Rate (TRIFR)	2.8	3.5	4.1
Environmental Non-Compliance Incidents	4	5	6
Average Cost of Environmental Non-Compliance Incidents	1,00,000	1,20,000	1,50,000

*LTIFR = (Number of lost time injuries / Total hours worked) x 10,00,000

*TRIFR = (Number of recordable injuries / Total hours worked) x 10,00,000

Based on the above data, we can perform an EWS analysis for the EHS department in the manufacturing unit.

Here are some observations:

➢ LTIFR and TRIFR have both decreased from the previous year, which is a positive trend. However, the LTIFR is still higher than the industry average, indicating that there is still room for improvement in terms of reducing lost time injuries.

➢ Environmental non-compliance incidents have decreased from the previous year, which is another positive trend. However, the average cost per incident has increased, indicating that there may be a need to invest in better environmental management practices to reduce the overall cost of incidents.

➢ Comparing the current year data to industry data, we can see that the manufacturing unit is performing better than the industry average in terms of LTIFR and TRIFR, but there is room for improvement in terms of environmental non-compliance incidents and associated costs.

Overall, the EWS analysis suggests that the EHS department is making progress in improving safety and environmental compliance, but there is still work to be done to meet or exceed industry benchmarks. The company may want to consider investing in additional safety and environmental management resources to further improve performance.

Practical Examples of EWS in Information Technology (IT) Department

➢ **Increase in cybersecurity incidents or threats:** If there is an increase in cybersecurity incidents or threats, it may indicate that there are issues with IT security protocols, employee training, or software vulnerabilities

➢ **Increase in data errors or inconsistencies:** If there is an increase in data errors or inconsistencies, it may indicate that there are issues with IT systems or data management protocols

➢ **Increase in software licensing or maintenance costs:** If there is an increase in software licensing or maintenance costs, it may indicate that there are issues with software utilization or that software upgrades are needed

➢ **Increase in IT support requests:** If there is an increase in IT support requests, it may indicate that there are issues with IT infrastructure, software, or hardware that need to be addressed

Illustration of EWS in Information Technology Department

Suppose the IT department manages the computer network for a manufacturing company. The department's primary responsibility is to ensure that the network is running efficiently and that all employees have access to the software and data they need to perform their job functions.

Here are some example KPIs and data sets that the IT department may track.

A. **Network uptime percentage**: This KPI measures the percentage of time that the network is available and accessible to employees. The IT department may set a target uptime percentage of 99.9%.
1. Previous year's uptime percentage: 99.8%
2. Current year's uptime percentage: 99.7%
3. Industry benchmark uptime percentage: 99.9%

B. **Server response time**: This KPI measures the time it takes for the server to respond to a request from an employee. The IT department may set a target response time of 0.5 seconds or less.
1. Previous year's average response time: 0.4 seconds
2. Current year's average response time: 0.6 seconds
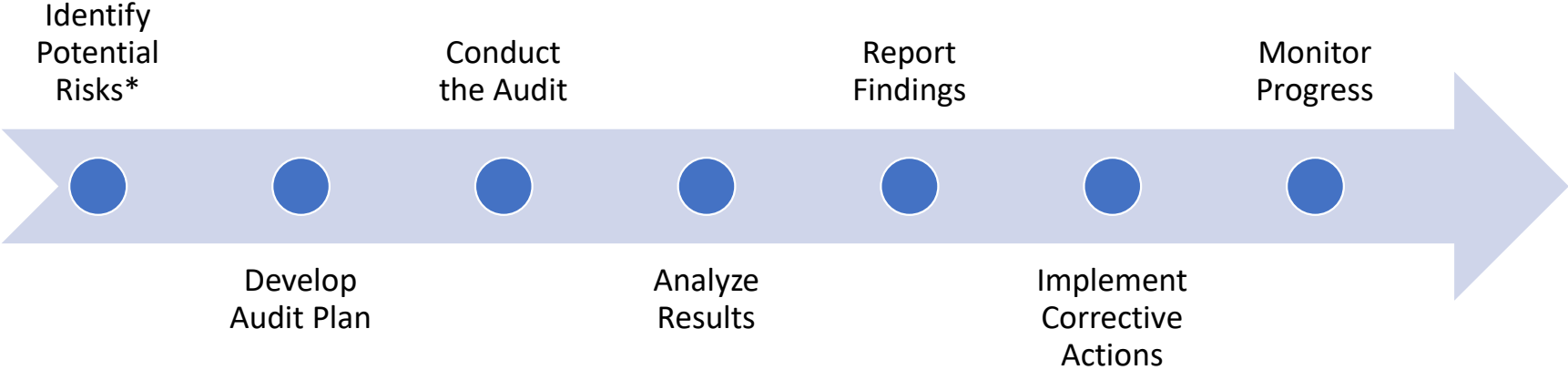3. Industry benchmark average response time: 0.3 seconds

C. **Number of network security incidents**: This KPI measures the number of security incidents, such as malware infections or unauthorized access attempts, that occur on the network.
1. Previous year's number of incidents: 10
2. Current year's number of incidents: 15
3. Industry benchmark number of incidents: 5

- To set up an EWS based on these KPIs, the IT department could use a tool such as a dashboard that displays the KPI data and alerts them if any of the metrics fall outside of an acceptable range.
- For example, if the network uptime percentage drops below 99.5%, the EWS could send an alert to the IT department, allowing them to investigate and resolve any issues before they become critical.
- Similarly, if the server response time exceeds 1 second or the number of security incidents exceeds 20, the EWS could trigger an alert, prompting the IT department to take action.

Internal Audit Process for Early Warning Signal Detection

Objective: To ensure that potential risks and early warning signals are effectively addressed.

Identify Potential Risks*

Conduct the Audit

Report Findings

Monitor Progress

Develop Audit Plan

Analyze Results

Implement Corrective Actions

*The risks could relate to equipment failure, process variability, quality issues, safety hazards etc…

Key Factors to consider while incorporating EWS in the audit processes

➢ **Understanding the Manufacturing Process**

Internal auditors should have a deep understanding of the manufacturing process to identify potential risks and EWS

➢ **Effective Communication**

Ensuring effective communication between all relevant stakeholders helps identify and address potential risks and EWS in a timely manner

➢ **Continuous Monitoring**

Continuous Monitoring of the Manufacturing Process can help identify and address potential risks and EWS before they escalate

➢ **Data Analytics**

Using data analytics tools can help identify patterns and anomalies that can serve as EWS for potential risks.

➢ **Risk Assessment**

Conducting a Comprehensive Risk Assessment helps identifying potential risks and EWS that can be incorporated into the audit process

Methodologies to incorporate EWS

➢ **Implementing Automated Tools to Continuously monitor key risk indicators to detect potential issues**

This methodology allows auditors to identify and address issues as they occur, rather than waiting until the next audit cycle.

➢ **Using data analytics to identify patterns and anomalies that may indicate a heightened risk of fraud or non-compliance**

This methodology involves analyzing large amounts of data to identify potential issues and prioritize areas for audit focus.

➢ **Developing scenarios to identify potential risks and create response plans**

This methodology involves creating hypothetical scenarios and developing plans to address potential risks before they occur.
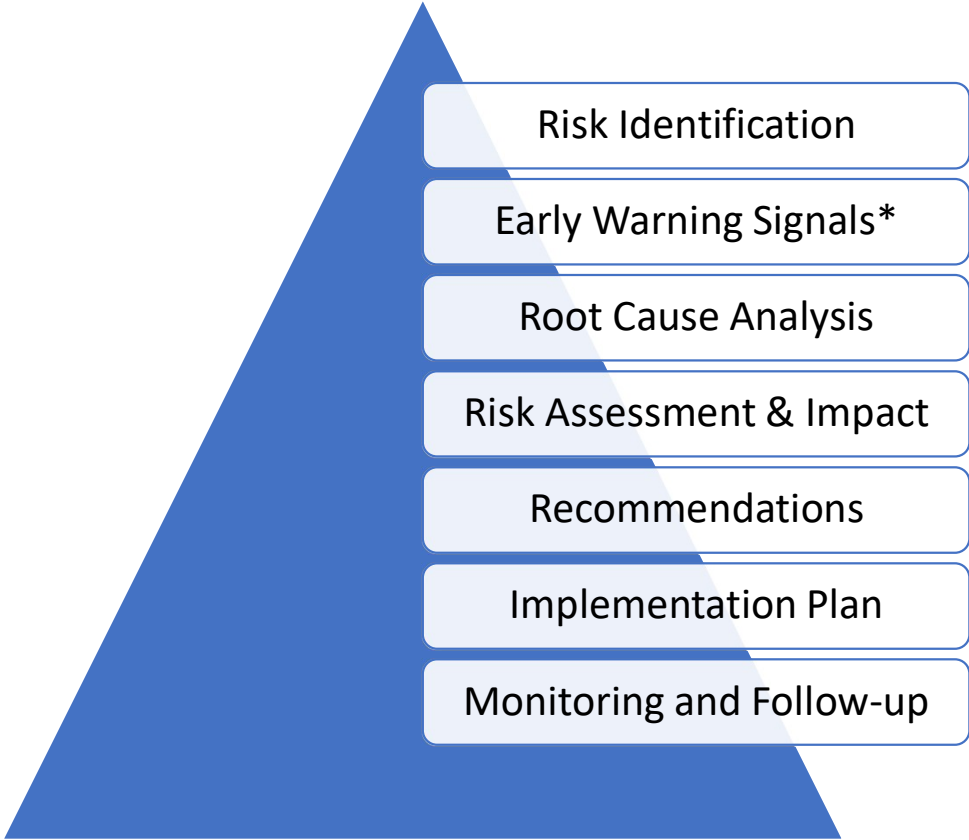
➢ **Comparing performance metrics with industry benchmarks to identify potential issues**

This methodology involves comparing key performance indicators with industry benchmarks to identify areas where the company may be falling behind or at greater risk of issues

Best Practices for EWS Detection in Internal Audits for Manufacturing Units

➢ Focus on Key Risks that are most critical in M/f Process
➢ Involve Multiple Departments that EWS are identified from multiple angles
➢ Use data analytics to analyze large data sets to identify trends and patterns
➢ Incorporate relevant industry standards and best practices into the audit process
➢ Involve employees in the audit process by soliciting their input and feedback.
➢ Conduct ongoing monitoring of EWS to ensure that corrective actions are effective and that potential risks are proactively addressed.
➢ Continuously improve the audit process

Key Components of Early Warning Signal Detection in Internal Audit Reports

Risk Identification

Early Warning Signals*

Root Cause Analysis

Risk Assessment & Impact

Recommendations

Implementation Plan

Monitoring and Follow-up

*EWS could include trends, patterns, and correlations in the data that indicate a potential risk

Ways to Mitigate the Risks identified through Internal Audits

➢ **Conduct a through risk assessment to identify potential risks and their likelihood of occurrence**
This will help prioritize which risks to address first and allocate resources accordingly.

➢ **Implement internal controls to mitigate identified risks**
This includes developing policies and procedures, implementing segregation of duties and establishing access controls.

➢ **Provide continues training and education to employees and management**
This ensures that everyone is aware of the potential risks and knows how to identify and report any suspicious activity.

➢ **Monitor and test the effectiveness of internal controls**
This includes regularly reviewing and testing controls to identify any weakness or areas for improvement.

➢ **Continuously improve internal audit processes and procedures**
This includes incorporating feedback from audits and making necessary changes to improve the

EWS vs exceptional reporting

Particulars	Early Warning Signals (EWS)	Exception Reporting
Timing	EWS is a proactive approach that aims to identify potential issues before they occur	Exception Reporting is a reactive approach that aims to identify issues that have already occurred
Focus	It focuses on monitoring key performance indicators, trends, and patterns to identify potential issues or risks before they escalate into major problems	It focuses on investigating and analyzing the root cause of issues that have already occurred
Trigger	It is triggered by changes in key performance indicators or trends	It is triggered by a specific incident or issue that has been identified
Nature of the issue	It is used to identify potential issues related to process, quality, safety, or compliance	It is used to investigate and address issues related to non-conformance, deviations, or incidents that have already occurred
Response	It triggers a response to prevent potential issues from escalating into major problems	It triggers a response to address the root cause of the issue and prevent its recurrence

Conclusion

- ✓ In conclusion, early warning signal detection through internal audits is crucial for identifying potential risks and issues in manufacturing units before they escalate into major quality and safety incidents.
- ✓ By implementing effective internal audit processes that focus on key risks, utilize data analytics, and incorporate industry standards, manufacturing units can better identify and address potential risks and early warning signals.
- ✓ This can lead to improved quality, increased safety, and reduced costs associated with corrective actions and potential incidents.
- ✓ By continuously monitoring and improving the audit process, manufacturing units can proactively identify and address potential risks, ultimately ensuring the long-term success of their operations.

As the Chandokya Upanishad says:

If we apply knowledge with faith, dedication and deep analysis, our actions become stronger. This will lead to success.

Yadaiva Vidyaya Karoti

Shradhaya Upanishada

Tadeva Viryavattaram Bhavati!

*****

Thank you

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