



# Process Discovery and Mining

## **"The Digital way"**

# BACKGROUND SUMMARY

Process Discovery and Process Mining has always been the “1st Chess coin move” by most of the high-end IT Automation Consulting and System Integrators like us. We deep-discuss with the Strategy team, Operations team and finally, the Transactional Teams to understand and capture the business processes, workforce time and efforts, workflows involved, business rules followed, various applications used and all kinds of interfaces with internal and external applications. The discovery team then comes up with their finding as “AS-IS State Analysis” to let the top-level management know the current status of their organization; for them to decide on what should be the “TO-BE State” with new improved technologies and omni-channels to seamlessly collaborate with partners, suppliers, employees, and customers. Typically, the manual discovery process takes from 6 to 12 weeks, depending on the size of the organizations and their process complexities.

The renowned French writer Marcel Proust says, “The real voyage of discovery consists not in seeking new landscapes, but in having new eyes.” Is it not triggering new ideas...? Yes, it is!!

This paper explains the digital way of doing the manual Process Discovery and Process Mining, called “Digital Process Scanning and Mining (DPSM)”. The DPSM tool scans the business processes by picking up all the relevant data/information from business endpoints and logs associated with the applications for the Discovery team to understand the complexities involved, the volume of manual work, overall manual processing time and rework efforts and time due to manual errors etc., to help them plan for their future IT landscape with improved business functionalities to stay ahead of the market. It helps the organizations explore where do they stand and where and how to move forward towards reaping the real benefits of Digital Transformation.

# BUSINESS PROCESS, SUBPROCESS AND TASKS:

Let us recall the basics.

As per the Software Engineering Theory, the process is a sequence of tasks and activities associated with it, including subprocesses, the sequence in which the tasks are run and ways to control how the tasks are run, such as rules and delays. Processes are easy to understand as a concept, they are simply the entire set of things a company does to deliver the actionable items.

The diagram below illustrates the dynamic link between the process and its components, such as subprocess, tasks and activities.



Fig 1: Business Process and its components.

Typically, Organizations have different sets of business processes to address specific needs, and each process has multiple subprocesses. Each subprocess has a list of tasks and activities, running either in sequence or in parallel within and outside the process, connected by inbound and outbound interfaces.

The representation below explains the relationship between the process and its components, which are classically connected with other tasks such as decision making and creating procedures, etc. While activities such as data entry and create documents etc. are further connected with associated tasks.

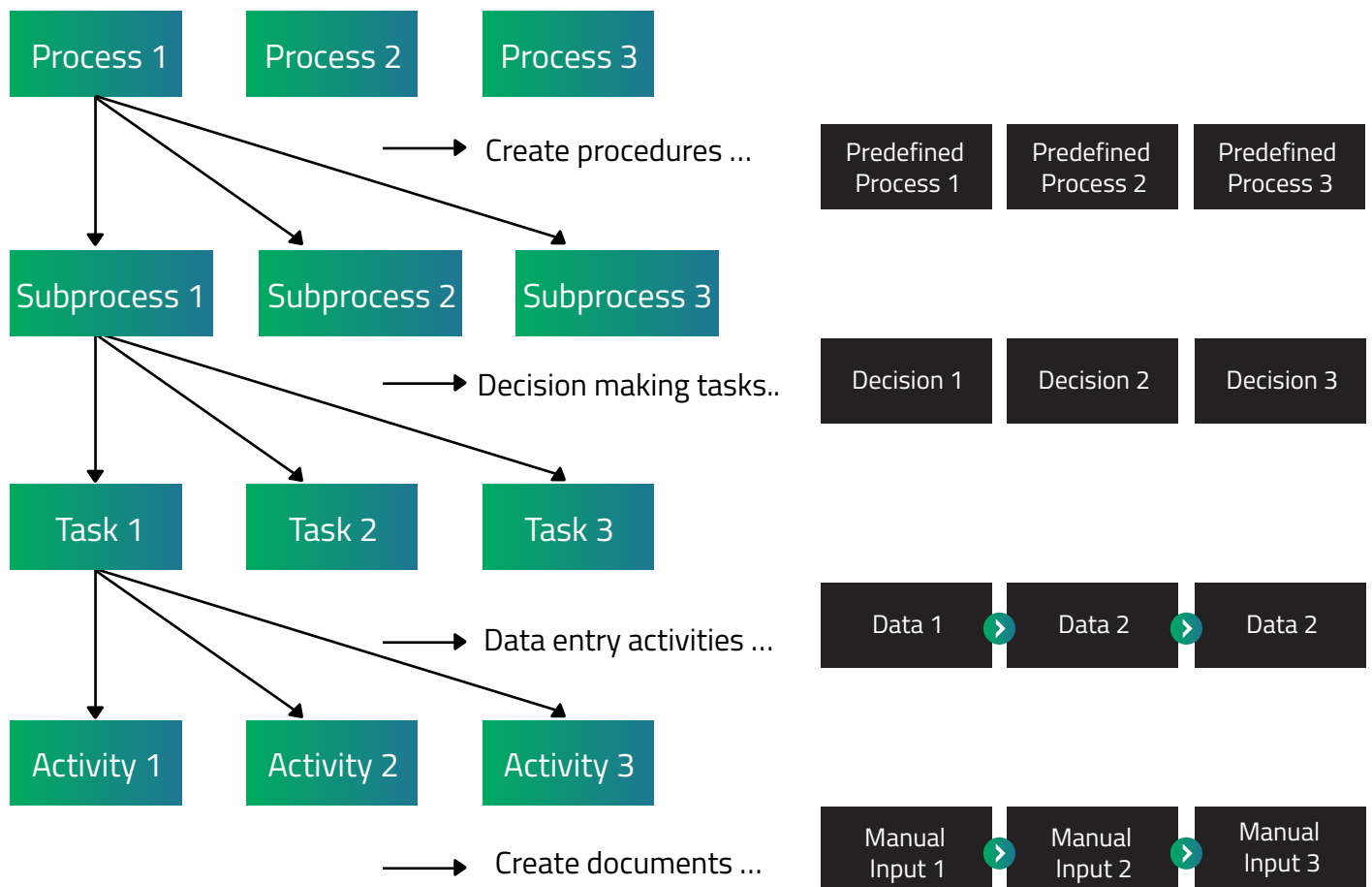


Fig 2: The relationship between Process and its components.

Often, the Decision-making process is always a complicated process in organizations, as multi-level approvals are required to make minor to major business decisions, which involves the intervention of many people holding specific positional hierarchy and job hierarchy across processes and subprocesses within the organization. Here is whether the activities are bundled together as tasks, which are further bundled to form a subprocess and finally the process.

# BUSINESS PROCESS – IN A NUTSHELL:

The traditional business processes across the organizations, depending on the verticals, could be diagrammatically depicted as follows, to show how they are integrated together.

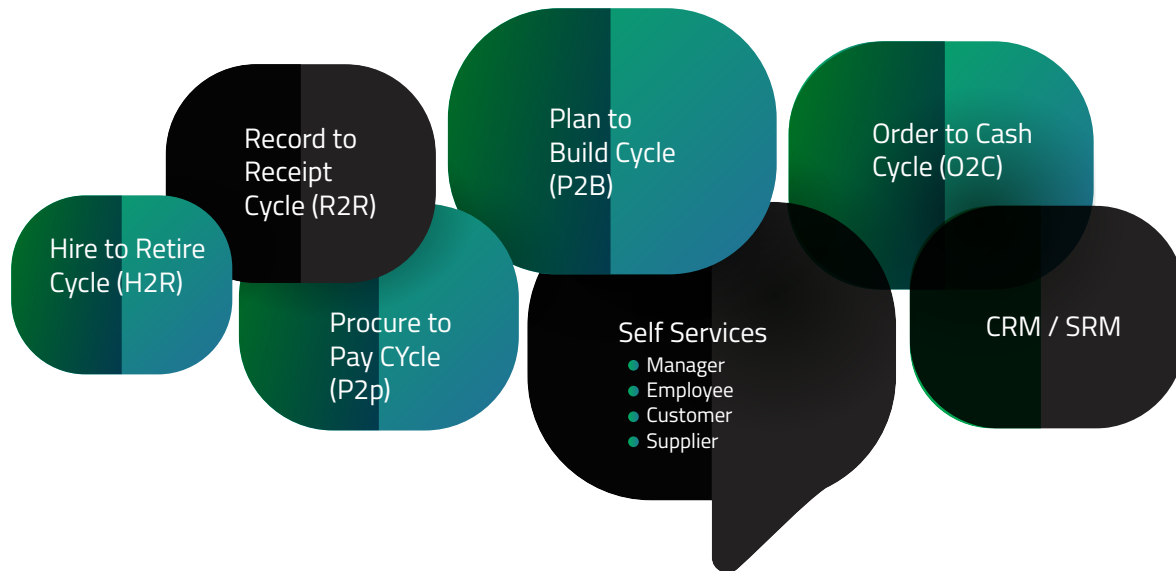


Fig 3: Typical Business Processes and its connectivity.

Each of the business process has been designed to address the business needs of the organization. Typically, any Enterprise Resource Planning (ERP) applications address all these major processes in the form of modules underneath. As Gartner rightly says, “Enterprise resource planning (ERP) is defined as the ability to deliver an integrated suite of business applications, sharing a common process and data model, covering broad and deep operational end-to-end processes, such as those found in Finance, HR, Distribution, Manufacturing, Service and the Supply chain”. (<https://www.gartner.com/en/information-technology/glossary/enterprise-resource-planning-erp>). ERP applications automate and support a range of administrative and operational business processes across multiple industries, including the line of business, customer-facing, administrative and asset management aspects of an enterprise. ERP deployments are complex and expensive endeavors, and some organizations struggle to define the business benefits.

- |    |  |    |  |    |  |    |  |  |
|----|--|----|--|----|--|----|--|--|
| 01 | Record -To-Receipt (R2R) process to address the Financial needs        | 02 | Source-To-Approve (S2A) process to address the Sourcing needs  | 03 | Procure-To-Pay (P2P) process to address the Procurement needs                    | 04 | Order-To-Cash (O2C) process to address the Sales needs |  |
| 05 | Hire-To-Retire (H2R) process to address the Human Resources (HR) needs | 06 | Plan-To-Build (P2B) process to address the Manufacturing needs | 07 | Acquire-To-Retain (A2R) process to address the Customer Relationship (CRM) needs |    |  |  |

The table below, explains each business process and related functional modules behind in it.

| Business Function | Business Process                 | Module | Module Name         |
|-------------------|----------------------------------|--------|---------------------|
| Finance           | Record -To-Receipt (R2R) process | GL     | General Ledger      |
|                   |                                  | AP     | Accounts Payable    |
|                   |                                  | AR     | Accounts Receivable |
|                   |                                  | CM     | Cash Management     |
|                   |                                  | AM     | Asset Management    |

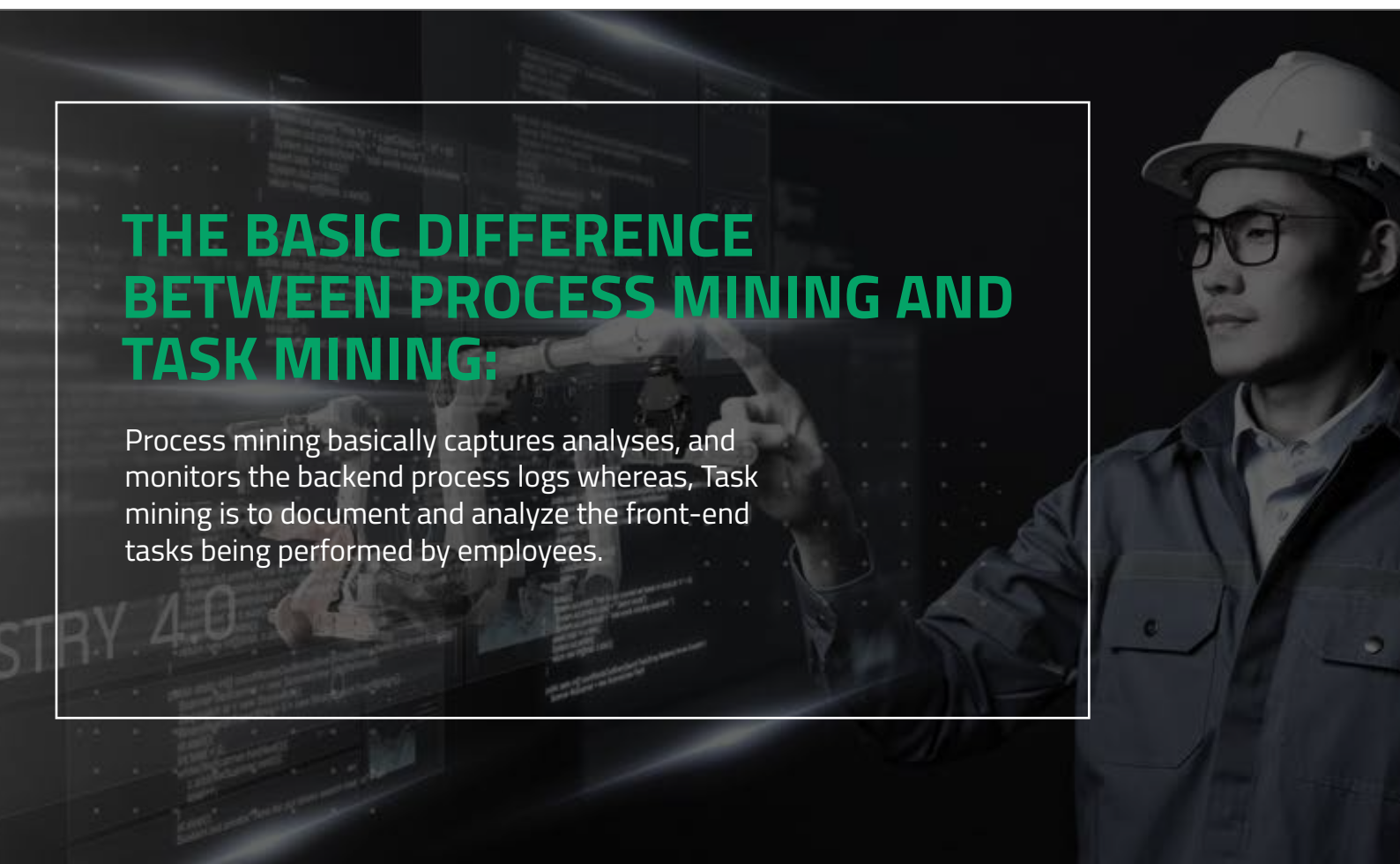
| Business Function | Business Process                | Module      | Module Name                      |
|-------------------|---------------------------------|-------------|----------------------------------|
| Sourcing          | Source-To-Approve (S2A) process | RFQ         | Request for Quote                |
|                   |                                 | SRM         | Supplier Relationship Management |
|                   |                                 | PR          | Purchase Requisition             |
|                   |                                 | PA          | Purchase Agreement               |
|                   |                                 | PO          | Purchase Order                   |
|                   |                                 | INV         | Inventory Management             |
| Procurement       | Procure-To-Pay (P2P) process    | PO          | Purchase Order                   |
|                   |                                 | INV         | Inventory Management             |
|                   |                                 | AP          | Accounts Payable                 |
|                   |                                 | GL          | General Ledger                   |
| Sales             | Order-To-Cash (O2C) process     | SO          | Sales Order Management           |
|                   |                                 | Adv.Ship    | Advanced Shipping                |
|                   |                                 | Adv.Pricing | Advanced Pricing                 |
|                   |                                 | INV         | Inventory Management             |
|                   |                                 | AR          | Accounts Receivable              |
|                   |                                 | GL          | General Ledger                   |

| Business Function | Business Process             | Module  | Module Name                   |
|-------------------|------------------------------|---------|-------------------------------|
| Human Resources   | Hire-To-Retire (H2R) process | HRMS    | Employee Records Management   |
|                   |                              | Payroll | Global Payroll Management     |
|                   |                              | T&L     | Time and Labor                |
|                   |                              | TA      | Talent Acquisition            |
|                   |                              | CB      | Compensation and Benefits     |
|                   |                              | LMS     | Leave Management              |
|                   |                              | GCM     | Grievances and Complaint Mgmt |

| Business Function                      | Business Process                | Module  | Module Name                     |
|--|---------------------------------|---------|---------------------------------|
| Manufacturing                          | Plan-To-Build (P2B) process     | BOM     | Bill of Materials               |
|  |                                 | PDM     | Product Data Management         |
|  |                                 | MRP     | Materials Requirement Planning  |
|  |                                 | DSP     | Demand Supply Planning          |
|  |                                 | MPS     | Master Production Scheduling    |
|  |                                 | RCCP    | Rough Cut Capacity Planning     |
|  |                                 | MPP     | Monthly Production Planning     |
|  |                                 | WPP     | Weekly Production Planning      |
|  |                                 | DPP     | Daily Production Planning       |
|  |                                 | SPP     | Shift Production Planning       |
|  |                                 | OSP     | Outside Processing              |
|  |                                 | Routing | Routing Planning                |
| Customer Relationship Management (CRM) | Acquire-To-Retain (A2R) process | TAM     | Territory Assignment Management |
|  |                                 | PM      | Partner Management              |
|  |                                 | LOM     | Leads & Opportunity Management  |
|  |                                 | CCC     | Customer Contact Center         |
|  |                                 | CAR     | Customer Analytics & Reporting  |

## THE BASIC DIFFERENCE BETWEEN PROCESS MINING AND TASK MINING:

Process mining basically captures analyses, and monitors the backend process logs whereas, Task mining is to document and analyze the front-end tasks being performed by employees.



## PROCESS DISCOVERY AND PROCESS MINING:

Gartner says, “Process Discovery and mining is a technique designed to discover, monitor and improve real processes, i.e., not assumed processes, by extracting readily available knowledge from the event logs of information systems”.

(<https://www.gartner.com/en/information-technology/glossary/process-mining>)

Wikipedia says, “Business process discovery (BPD) is a set of techniques that manually or automatically construct a representation of an organizations’ current business processes and its major process variations. These techniques use evidence found in the existing organizational methods of work, documentations, and technology systems that run business processes within an organization”.

([https://en.wikipedia.org/wiki/Business\\_process\\_discovery](https://en.wikipedia.org/wiki/Business_process_discovery)).

In this paper, the author proposes, “Process discovery and mining is an intelligent exercise done, which is a complete and thorough analysis of the organization’s processes, from people, process, applications and technology perspectives, with an objective of portraying, where does the organization stand today, while they aspire to jump out to an advanced business process to delight their customers, employees and suppliers.”

## WHAT IF, THIS MANUAL DISCOVERY PROCESS IS AUTOMATED.?

**Yes.**

Let us explore how this human based process could be automated, in a digital way...!!

## THE DIGITAL PROCESS SCANNING AND MINING:

The digital way of doing the manual Process Discovery and Process Mining is called as Digital Process Scanning and Mining (DPSM).

The DPSM tool scans the business processes by picking up all the relevant data/information from business endpoints and logs associated with the applications for the Discovery team to understand the complexities involved, volume of manual work, overall manual processing time and rework efforts and time due to manual errors etc.,

To get a clear 360° view of the existing business processes and subprocesses of any organization, across people, applications, process and technology being used the Digital Process Scanning and Mining (DPSM) tool, needs to capture the complete data using the following techniques.

The Digital Process Scanning and Mining (DPSM) techniques are,

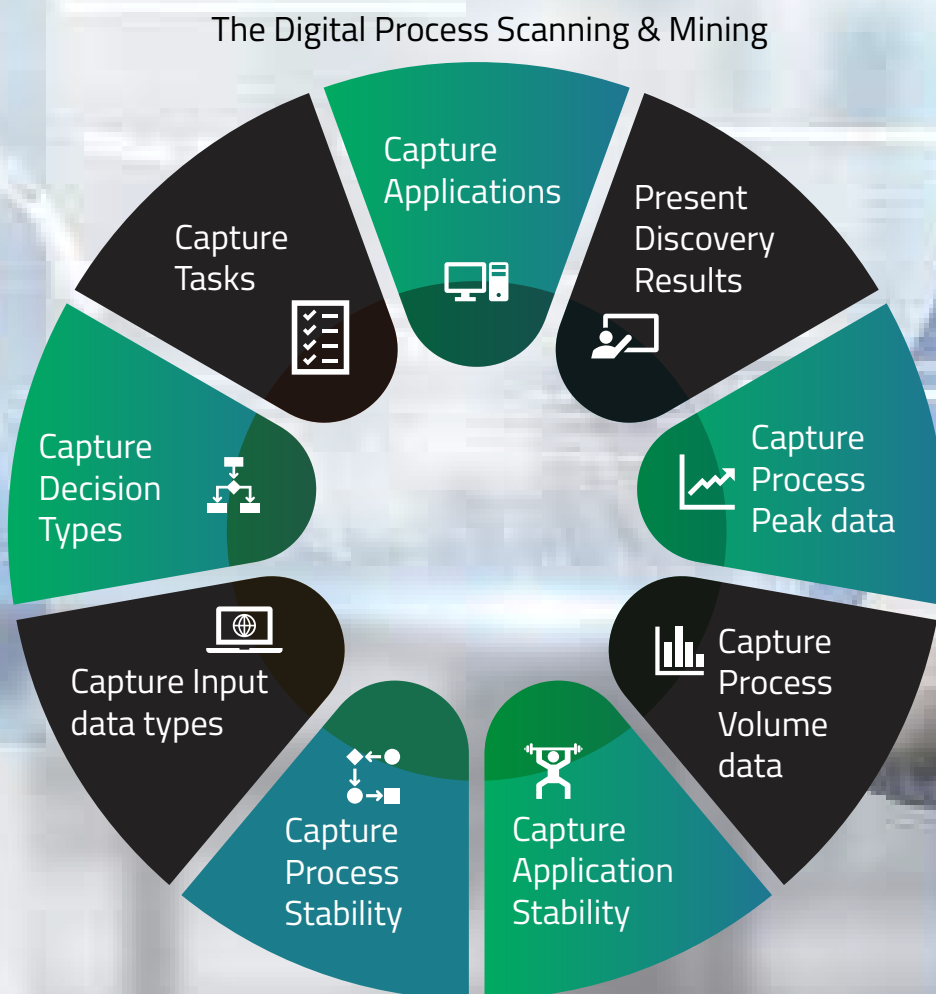
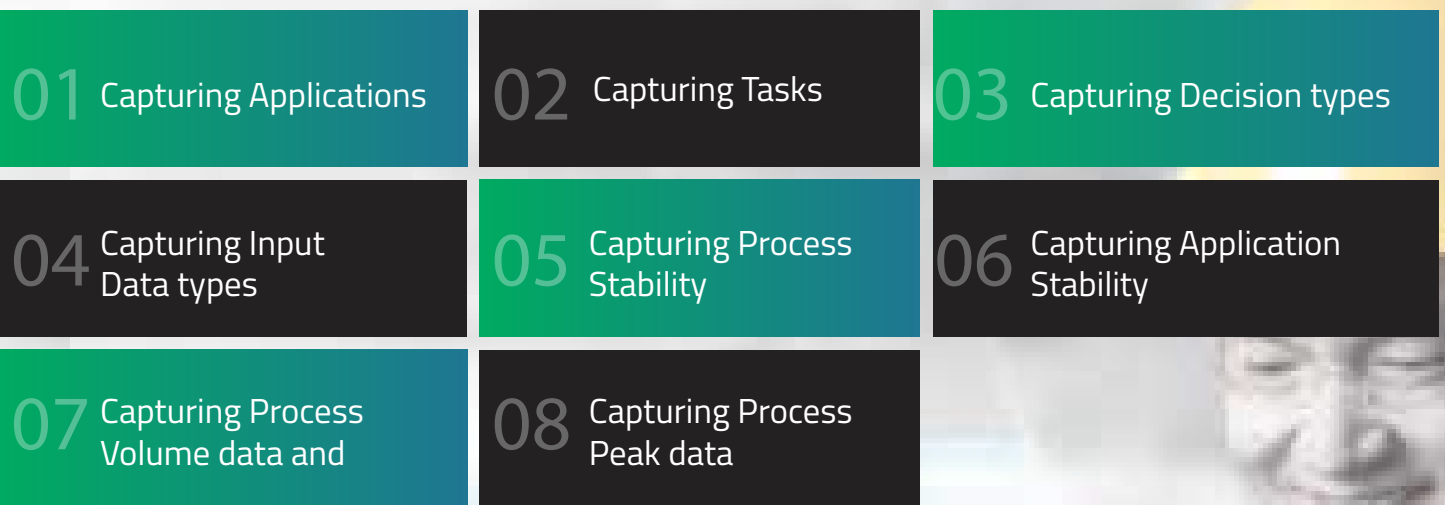


Fig 4: Components of Digital Process Scanning and Mining

## 01 CAPTURING APPLICATIONS:

The Digital Process Scanning and Mining tool captures the application types being used, as follows:

|   |   |                                    |
|---|---|------------------------------------|
| Java or Dot Net based                           | Mainframe based                           | ERP based                          |
| Number of screens used during the transactions, | Structured or unstructured input data and | Any other image-based information. |

During the Scanning process, besides the applications, data about the number of users, time spent on each application to process multiple transactions, documents being uploaded or downloaded, documents shared through other internal communication channels, number of websites visited, and time spent. Number of chats and meetings attended, and time spent etc.,

## 02 CAPTURING TASKS:

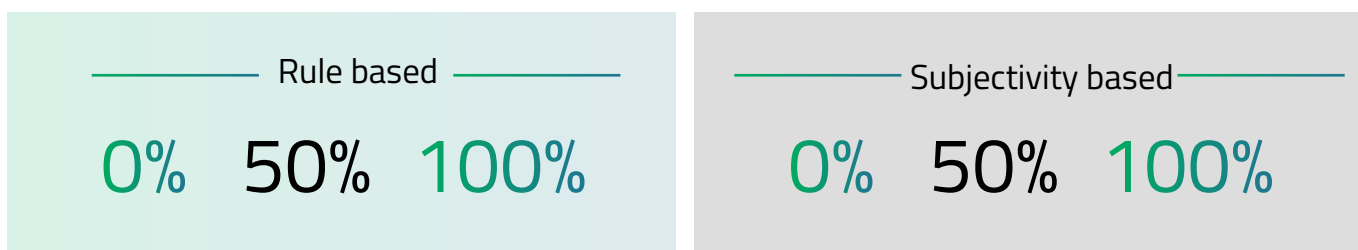
The Digital Process Scanning and Mining tool captures the subprocess level tasks, within each process as follows:

|            |  |
|------------|--|
| Rule based | Task types such as <ul style="list-style-type: none"> <li>➤ Manual and repetitive,</li> <li>➤ Semi-manual and repetitive,</li> <li>➤ Fully automated and</li> <li>➤ Manual but not repetitive etc.,</li> </ul> |
|------------|--|

Capturing detailed information about the tasks (data or time and efforts) would help the leadership team to plan for automating the manual tasks which are repetitive, recurring and large in volume, taking a considerable amount of time and efforts by the operation and transaction level users, including the time on rework.

## 03 CAPTURING DECISION TYPES:

The Digital Process Scanning and Mining tool captures whether the decisions are rule-based or subjective or strategic, based on the following user input.



Based on the user input, the Automation tool populates the Score as follows.

100%

Feasible for automation

50%

Feasible for automation and

0%

Not Feasible for automation

Rule based decisions are simply Yes or No types as there can't be something in between, which is subjectivity based. Typically, these kinds of decision types are captured for the leadership team to standardize the decision types across business processes, which will speed up the decision-making time and further business transactions.

## 04 CAPTURING INPUT DATA TYPES:

The Digital Process Scanning and Mining tool captures all types of input data, used in the transactions based on Digital or Structured and a combination of which, results into 4 different input data types as follows.

Digital and Structured  
Input data

Non-digital but  
Structured Input data

Digital and Unstructured  
Input data and

Non-digital and  
Unstructured Input data

Based on the combination chosen above, the Automation tool populates the Score as follows.

100%

Feasible for automation

50%

Feasible for automation and

0%

Not Feasible for automation

Organizations communicate with their partners, suppliers, employees, and customers. During the interactions, a variety of documents are being shared such as Contracts, Agreements, Purchase orders Sales Invoices and Customer Invoices in varied formats and patterns. Some invoices are well structured and nicely formatted whereas they also receive unstructured and poorly formatted invoices that becomes a headache for the organizations, to process and finally, they end up spending, lot of time and efforts in reading those unstructured invoices.

## 05 CAPTURING PROCESS STABILITY:

The Digital Process Scanning and Mining tool captures the stability across all the processes using the following input criteria from the Process owners, whether the processes across the organization are likely to change in the next 3-6 months' timeframe.

0%

No Significant changes expected

10-40%

Minor to Medium changes expected

50% & above

Major Significant changes expected

Based on the user input above, the Automation tool populates the Score as follows.

100%

Feasible for automation

50%

Feasible for automation and

0%

Not Feasible for automation

Organizations do change their business processes for various reasons viz., Technology update, Business Process Re-Engineering (BPR) and Strategic alignment exercise with partner or Supplier ecosystems etc.,

When the changes are likely to happen within a few processes or across the organization, the stability of the process changes from low to high. It is always advisable to postpone any new Automation initiatives if the process related changes are expected to happen within 5-6 months of time frame.

## 06 CAPTURING APPLICATION STABILITY:

The Digital Process Scanning and Mining tool captures the stability, across all the business-oriented applications using the following input criteria from the Process owners, whether the business applications across the organization, are likely to change in the next 3-6 months' time.

0%

No Significant changes expected

10-40%

Minor to Medium changes expected

50% & above

Major Significant changes expected

Based on the user input above, the Automation tool populates the Score as follows.

**100%**

Feasible for automation

**50%**

Feasible for automation and

Postpone the automation plan.

Organizations, do change their business applications for various reasons viz., Technology update, Business Process Re-Engineering (BPR) and Strategic alignment exercise with partner or Supplier ecosystems etc., When the changes are likely to happen within a few processes or across the organization, the stability of the applications, changes from low to high. It is always advisable to postpone any new Automation initiatives if the application related changes are expected to happen within 5-6 months of time frame.

## 07 CAPTURING PROCESS VOLUME DATA:

The Digital Process Scanning and Mining tool captures the process volume data, across all the processes, based on the following input criteria from the Process owners.

Frequency of the transactions

Such as  
Hourly, daily, weekly, monthly, yearly

Volume of transactions/  
frequency

Such as  
Number of times the process is run

Average time for the process to be run once

Such as  
Seconds or minutes.

The Process volume data gives a detailed insight into the transaction time and its volume over a period and also the volume of data produced by the business applications for the leadership team to optimize the performance of the applications to speed up the execution time keeping in mind, the quicker response to customer orders and queries etc., This also becomes an input for the internal IT team to deploy the right infrastructure such as high-end servers and hi-speed networks, to provide 99.99% system availability to the users.

## 08 CAPTURING PROCESS PEAK DATA:

The Digital Process Scanning and Mining tool captures the process peak data across all the processes based on the following input criteria from the Process owners.

Regular (e.g. month closing), lasting for several days or weeks in a row and increasing the utilization of the team capacity by > 20%

Rare but predictable event (e.g. winter holidays/ yearly closing), lasting for the several days or weeks in a row and increasing the utilization of the team capacity by > 20%

Rare event, hard to predict, of short duration

The process does not have peaks.

It's a well-known fact that organizations have workload peaks, like spikes throughout the calendar year, and the load goes to peak, especially during the 1st or 4th week of every month, as month end closing exercises are done, across Corporate functions such as HR & Payroll, Expense reimbursements, Finance & Accounts, Sales and Marketing, Production and Warehouses besides Statutory and Mandatory compliance related exercises. The Process Peak data gives a greater insight for the leadership team to take appropriate preventive and corrective measures, in terms of load-balancing and load re-trafficking etc., failing which the system performance would drastically come down, leading to poor system availability.

## PRESENTING THE DISCOVERY RESULTS:

At the end of the Digital Process Scanning exercise, the results are shown and explained to the leadership team and Process owners, the current status of the organization, from people, process, and technology perspectives.

The result of Digital Process Scanning gives a “deep-dive experience” for the Organization leaders to understand the existing landscape, to plan future upgrades.

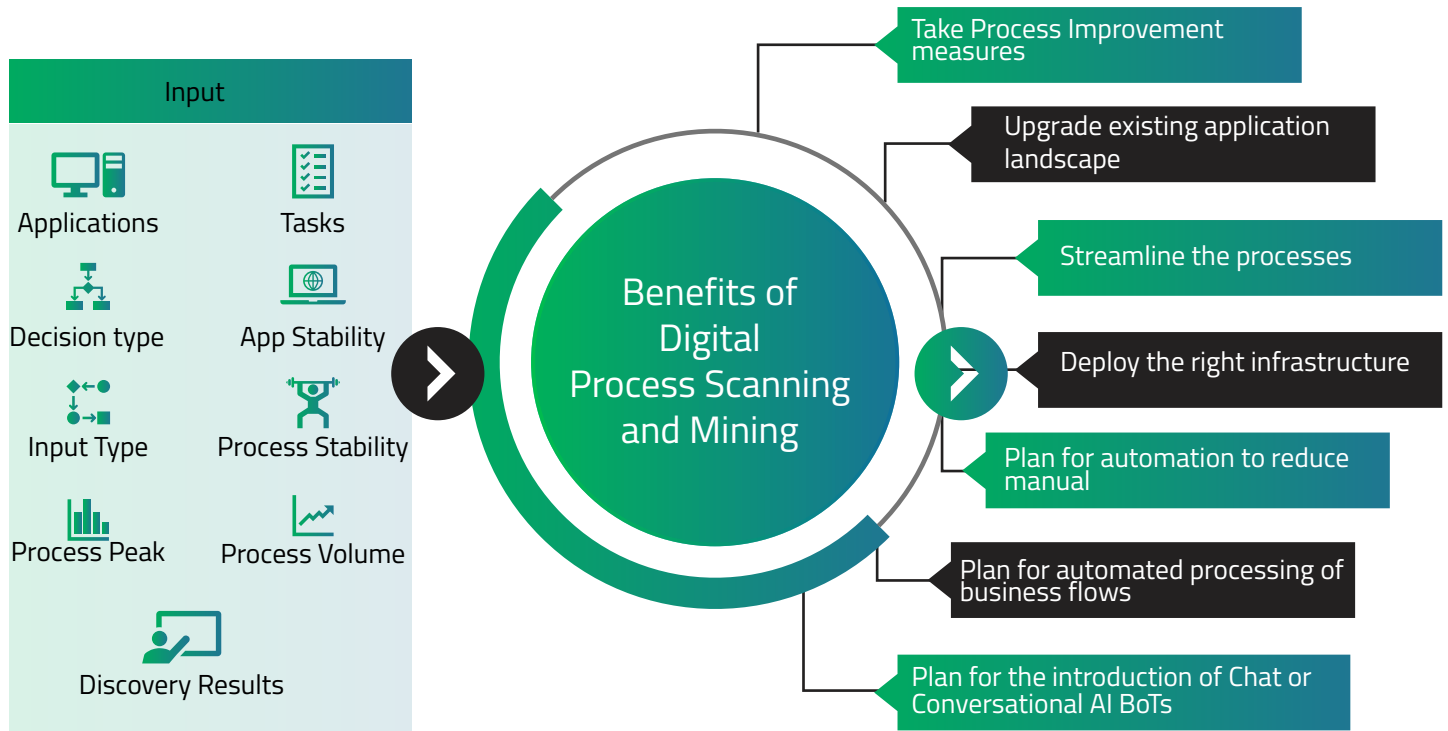


Fig 5: Benefits of Digital Process Scanning and Mining.

The leadership team now has a better insight into their existing IT application landscape and is geared up to plan for their future state by upgrading their landscape, streamlining their processes, deploying the right and robust infrastructure, and designing plans to automate most of the manual business work including plans to introduce conversational ChatBoTs, round the clock and round the year, to provide a seamless business experience to their Customer-Supplier-Employee-Vendor ecosystems.

If you see any synergy between what you read now and what you typically experience in your organization and if there is a gap, you may like to reach out to one of our Digital Business Services (DBS) or Digital Process Automation (DPA) experts. We would be happy to be part of your Process Discovery and Automation journey.

# AUTHOR BIO



*Rajakumar Duraimurugan, has been with the DPA CoE at Happiest Minds Technologies Limited, as Director – Digital Automation, bringing in 25+ years of experience across Enterprise Resource Planning (ERP), Business Process Automation (BPA) and Robotic Process Automation (RPA) including Conversational AI, Virtual Agents platforms and Optical Character Recognition (OCR). Designed, built, and delivered numerous attended and unattended BoTs and solutions to automate variety of business processes, leveraging their base ERP/BPM applications. Provided Solutioning to many organizations in transforming to Digital Automation and helped them achieve direct saving on time and efforts by 45-65%, while keeping the accuracy to ~100%, without disturbing the existing IT application landscape and business, across North America, Europe, Singapore, Thailand and China. Worked for companies such as Cambridge Solutions (DXC now), Infinite, Trianz Consulting, Hexaware Technologies and Hitachi Appliances etc., Holds Master's in Computer science and published 10+ articles in International Conferences including few blog papers on Digital Automation, to his credit.*

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## About Happiest Minds Technologies



[www.happiestminds.com](http://www.happiestminds.com)

Happiest Minds Technologies Limited (NSE: HAPPSTMNDS), a Mindful IT Company, enables digital transformation for enterprises and technology providers by delivering seamless customer experiences, business efficiency and actionable insights. We do this by leveraging a spectrum of disruptive technologies such as: artificial intelligence, blockchain, cloud, digital process automation, internet of things, robotics/drones, security, virtual/augmented reality, etc. Positioned as 'Born Digital . Born Agile', our capabilities span digital solutions, infrastructure, product engineering and security. We deliver these services across industry sectors such as automotive, BFSI, consumer packaged goods, e-commerce, edutech, engineering R&D, hi-tech, manufacturing, retail and travel/transportation/hospitality.

A Great Place to Work-Certified™ company, Happiest Minds is headquartered in Bangalore, India with operations in the U.S., UK, Canada, Australia and Middle East.