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Guidelines for the use of AI in BPM systems

A GUIDE TO FOLLOW TO USE AI IN BPM SYSTEMS

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Dissertation presented as a partial requirement to obtain the Master's degree in Information Management

NOVA Information Management School
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GUIDELINES FOR THE USE OF AI IN BPM SYSTEMS

by

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Dissertation presented as to obtain the master's degree in Information Management with a specialization in Information Systems and Technologies Management

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ABSTRACT

Business Process Management (BPM) is a business process control, adaptation and optimization concept. BPM was defined as a systemic approach to catching, forming, executing and documenting, measuring, monitoring and steering automatic, non-automatic processes to achieve co-ordinated and sustainable corporate goals by means of the specific definition for BPM from European Association of Business Process Management (EABPM). BPM's objective is to increase corporate performance through the optimization and management of the company's business process.

AI-integrated BPM solutions help companies overcome performance barriers and increase their productivity and quality of work. AI is no longer a scary technology that has been difficult to use. Small and large companies gradually recognise the capacity to optimise their business processes via AI embedded BPM software. Over time, the broad use of AI is expected to become increasingly accessible to all companies for the automation of business processes.

Findings provide the guidelines, challenges, strategies, opportunities and techniques while moving from current, largely programmatic approaches for BPM, to emerging forms of AI- enabled BPM.

KEYWORDS

Artificial intelligence, Business Process Management, IOT

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LIST OF ABBREVIATIONS AND ACRONYMS

AI	Artificial Intelligence
BPMS	Business Process Management Systems
BPR	Business process reengineering
CBPM	Cognitive Business Process Management
CRM	Customer Relationship Management
CTO	Chief Technology Officer
EABPM	European Association of Business Process Management
ERP	Enterprise Resource planning
iBPM	Intelligent Business Process Management
ICT	Information and Computing Technology
IPA	intelligent process automation
IoT	Internet of Things
IRPA-AI	Robotic Process Automation and Artificial Intelligence
ML	Machine Learning
NLP	Natural Language Processing
RPA	Robotic Process Automation
SCM	Supply Chain Management

1. INTRODUCTION

The following introduction will contextualize this investigation by providing insights on its background and problem definition, specific objectives, and structure.

1.1. BACKGROUND AND PROBLEM IDENTIFICATION

The future of computing and technology is typically regarded as artificial intelligence (AI). In fact, impressive results have already been shown on autos, digital assistant voice operated, like Siri and Alexa, and facially recognized gadgets. That's only the start. Koos Du Preez, CTO of K2, said that when we see how it can be used for processes across a company, AI has the capacity to assist human expertise and innovation and shift our view of business difficulties. AI technology is a Business Process Management (BPM) partner: it can aid automatically manual and routine business activities, improve user interfaces, and quickly analyze vast amounts of data. Adding AI to BPM, also known as Intelligent Business Process Management (iBPM), helps companies to develop and automate their complicated processes by creating a dynamic, valuable knowledge-driven environment for technology. Businesses have indicated that iBPM is the next big thing in the BPM field since its implementation by Gartner in 2012. When business process management systems (BPMS) develop, we have evolved beyond systems that just execute predefined process templates to smarter systems that support, manage and automate processes dynamically. We need more processes and more human intelligence with computer intelligence to generate innovation and preserve operational efficiency.

The blending of BPM with intelligent technology has been driven by two factors: that BPMS is developed as a general application development platform that facilitates the easy integration of other techniques and that processes and decisions must be automated from efficiency to compliance for business reasons. Typical BPM-complementary smart technologies include:

- Enforce standards and best practices on business rules and automated decision making. This ensures, and applies the same decision-making logic, that a knowing employee does not breach a standard process for a certain task.
- For employees based on similar history and current events, predictive analytics recommend actions. This minimises employees' learning time to make better choices.
- The automation of semi-trained activities through machine learning (ML) and robotic process automation (RPA) automates semi-trained tasks by learning from human actions to identify the activities to carry out. This releases semi-trained jobs from knowledge workers to concentrate on difficult, unstructured work.

- Event handling Internet of Things (IoT) communicates with external devices or operations and can initiate processes/activities automatically, based on remote or external events.
- Complex event/stream processing looks for transaction trends, which can trigger new processing or anomaly warnings.
- Process mining detects and recommend actions and predicts on process completion, emerging models and behavior.

Not all these technologies are designated as AI, but in many others the AI and ML become building blocks that blur the line between precisely what is and isn't AI. For example, RPA may be used through basic training approaches that record and play the action of a user. When the RPA learners are deployed in advance to see the actions of a worker for some time, they will identify the best way to replace all of them.

Another solution that is rooted in more basic decision management is event processing, but the addition of AI/ML permits patterns across thousands of transactions that could not easily be recodified. For example, it can be used for the detection of fraudulent activities in financial transactions, network safety violations based on access methods or the failure of machine logs to prevent equipment. Though much of that would be done without the need of a BPMS, the BPMS would launch an event processing system.

Process mining is a further example. It can employ typical techniques for process discovery to illustrate the routes of a process instance, but in combination with AI it gains much more capability. These algorithms can predict completion for a process instance by introducing process metrics and allowing AI to seek the best path to follow, decide which route to follow for the improvement of the process metrics in this instance, and recommend how it can improve the process underlying the work in the future. This last capability – with AI 'settling' for an optimal performance model – ends the process optimization loop and makes self-healing processes possible.

These technologies are of course not mutually exclusive: several of them are commonly merged to construct smarter processes into one system.

Business innovation through intelligent processes

I find technology interesting as a technologist, but what counts truly is what companies can do. First of all, we find several operational advantages:

- Improved worker hours and end-to-end transaction cycle times. Improved efficiency.

- Improved quality via standardized processes and decisions and compliance.
- Further time is available to qualified personnel to tackle customer and other unstructured issues.

All methods boost customized happiness by automating untrained and semi trained chores that are a non-value-added overhead for the majority of employees, and can also increase job satisfaction.

Beyond those operative advantages, sharper AI/ML BPM enables companies to perform things that were previously impossible. For example, it is not only feasible to predict which instances in the process are likely to fail their service or regulatory objectives, but also prescribe – or even automate – remedial action to fulfil the deadlines. These measures could include skipping approval processes for instances of low risk, altering the work queue priorities, or assigning work to external contractors.

Definition of management of the business process

The demand for efficient, adaptable and effective business processes has increased in recent years as a consequence of Business Process Management (BPM) solutions. Our research purpose in this work is to describe the topic of BPM research in the light of environmental and technical developments. The disparity among topic concentration and study techniques selected by BPM researchers across geographical regions is of significant concern to us.

'Business Process Reengineering: Emergence of a New Research Field' (BPR) business process. Their research analyses BPR papers published in key MIS journals and/or produced in the area by trois promoters in line with the research and content strategy between 1988 and 1994 in order to provide initial insight into the development and state of BPR as a new field of research. For a larger research area (BPM) and for a length of time to date, we want to reproduce their experiments.

Business Process Management (BPM) is a business process control, adaptation and optimization concept. BPM was defined as a systemic approach to catching, forming, executing and documenting, measuring, monitoring and steering automatic, non-automatic processes to achieve coordinated and sustainable corporate goals by means of the specific definition for BPM from European Association of Business Process Management (EABPM). BPM's objective is to increase corporate performance through the optimization and management of the company's business process.

Business Process Management may be described as optimizing and managing business processes across single systems such as ERP, CRM, SCM and the complete network.

In addition, BPM system assignment involves step-by-step coordination and execution of business operations. The BPM System monitors, identifies and assesses problems or challenges in processes and demonstrates where a process is difficult and makes it possible for the company to optimize its process problem.

Using Artificial Intelligence in BPM

Three scenarios of how AI can be used for BPM are shown here.

- Case 1: Intelligent robot process (RPA) automation might be utilized to monitor, learn, and automate these patterns so people don't have to undertake redundant error-prone tasks.
- Case 2: During executions, machine learning may be used to initiate a new process or re-route the process according to predictions, for example.
- Case 3: Machine learning may also give suggestions – for example, for a next best move.

These three instances depend on unique predictions produced by each method.

The classical techniques of data mining, because processes express behavior that is far too complex with competition, bobbles, decisions and so on, do not work in processes, according to Wil van der Aalst, a teacher in the department of mathematics and computer science in Eindhoven University in the Netherlands.

There is another area in which AI can be utilized by a wider and data-independent method. The effect of delays – or stalled business processes – remains a challenge, as process-based applications get more sophisticated. Delays may be due, among other factors, to human mistake, lack of resources, peak workloads, and external dependence. So, the process itself can be looked at for forecasting.

AI is revolutionizing the BPM

The management of business processes (BPM) is a systematic method that allows businesses in their organization to establish efficient and successful workflows. It helps to quickly adapt and resist the ever-changing business environment. BPM helps to manage different business processes, for example the new contract for the automation of recurring operations to customer care.

With AI leading the business technology truck, Digital Transformation becomes firmly integrated throughout business operations. Making AI part of BPM gains a lot of traction for countless benefits. It helps companies to establish a dynamic technology environment to automate their complex procedures.

Here's how AI improves the administration of the business process

1. Automation of Redundant Chores:

Repeated tasks automation is one of AI's most prevalent uses. RPA is also referred to as robot process automation and is an automated learning program that supports the management of a vast array dedicated workers in redundant procedures.

2. Predictive analysis:

AI's one and the only quality is that the datasets acquired from different channels may be learned, observed and analyzed. These details are used by companies to define their action plan. AI can recognize patterns that cannot be interpreted by the human eye. The examination of data patterns for fraudulent activity in connection with online transactions or segmentation prospects for marketing purposes, for example.

3. Cost-effective:

BPM is an intense process that demands both considerable financial commitment and time. On the other hand, RPA is lucrative and utilizes the resources available. Therefore, with RPA methodologies, BPM principles can be implemented in a budget.

4. CX improvements:

The main motivation for AI adoption in BPM was the cost of improvement, but the focus has now been on increasing customer experience. AI-based BPM helps to acquire a good insight into the behavior of customers and the future patterns of consumption can be found on the basis of this input. The most common example of AI supported customer service is the implementation of chatbots and other related techniques. It enhances the experience of its clients and helps build a transparent communication platform.

5. Capabilities for decision-making:

AI's progress has introduced powerful machine learning algorithms such as decision trees and neural networks. These algorithms allow managers and business owners to address their challenges when expressing attributes for certain datasets to achieve the desired output. AI-based decision-making models can also help managers decide in a business process. These models, for example, can help decide if a product recommendation should be provided or if a follow up call is needed.

Applying AI in Business Processes: The Benefits

A large field of inquiry is artificial intelligence. An artificial intelligence definition is not easy and seems to require a strong comprehension of human intellect. Thus, the main AI textbook avoids defining the term and examines it more in the broader context of understanding its diverse forms of human and logical thinking and behavior. It is not surprising.

Most AI research considers rational thought and action as a precondition for smart conduct. In line, AI has investigated logical thinking and actions inside a "prediction, decision, action" circuit, in line with the forecast-conclusion cycle that we employ in an abstract model to analyze common activities within business processes. Naturally, the separation of predictions from the drawing and adopting of specific conclusions leads to the choice of a certain action which leads to a certain behavior. In fact, these tasks are intricately interlinked and many such loops overlap in human behavior. But separation is useful for a greater understanding of these operations and the development of technology to support or automate them. Over many years AI has evolved these in its several subfields and essential technologies, such as magnetic learning, decision-making and search algorithms correspondingly. Again, these technologies are frequently blended and integrated into each other in AI systems. In order to improve parameters and decrease classification errors, search algorithm may be employed within machine learn tools for example. Machine learning can improve search algorithms and improve their basic heuristics. However, examining them alone is a good starting point and a venue, in order to grasp the value and risk of any AI technology. The benefits of the resulting hybrid solution, combined technologies and overlapping loops, can be boosted and their hazards increased.

1. From Data to Prediction: Machine Learning

The data provided for a business process can be used to determine a prediction with machine learning algorithms. AI has developed several various machine learning methods, such as neural networks or decision-making trees, currently available for instance as ready-to-use libraries. Learning enables an agent, based on its observations of the world, to improve its performance. Research on machine learning distinguishes between supervised and unattended learning approaches, among other things. An agent learning patterns from the input without any explicit feedback in uncontrolled learning. In supervised training an officer learns the training data from labelled input-output pairs. On the basis of test data on which the agent can anticipate the output based on the provided input the result of its learning process is evaluated. Input and output representation, the type of model (input/output) you can train, and how you execute your learning differs. Learning algorithms differ. In order to describe the quality of a learning algorithm, the machine-learning community has established several measures

such as precision, reminder, AUC and other. Furthermore, statistical methods provide information such as trust intervals and default. These criteria are used to identify whichever type of learning should be prioritized over another when evaluating many machine-learning algorithms for a business application. If the percentages of the measures and tests are regarded as "excellent" or "sufficient" (usually expressed over a defined application domain threshold), the model is used.

Machine education is extremely fascinating for management of business processes as it detects patterns, i.e. functions relating to input and output that are not seen by people. These strategies are also helpful when it is difficult for humans to describe the features of the input data, which determine the result. The Go Game was recently mastered, for example, by a hybrid deep learning and search algorithm yet people have great difficulty evaluating a situation in a GO game and choosing a certain move that is very useful with regards to a particular strategy. The capacity to identify patterns is used successfully in corporate operations to detect deviant behavior, for example credit card fraud or classifying data, for example, for marketing purposes. Machine learning approaches can also be applied flexibly to changing inputs to make corporate processes more flexible, e.g., alter a case appreciation under changing circumstances. They can also be used to monitor business operations and to detect business rules. There are or can be imagined many other possible application scenarios.

2. From Prediction to Decision: Decision and Utility Theory

AI examines decision and utility theory in order to express and compute rational agents' preferences and identify the actions that an agent should take when maximizing its utility function. Decision theory is rooted in economics and investigates circumstances in which agents have to face uncertainties about the present state of the world and the future (because actions are uncertain) and in which agents have to deal with the conflicting aims, for instance, to maximize profitability while minimizing risk. The theory of decision enables agents to assess ambiguous and contradictory situations in a specified set of preferences within finite or infinite decision-making horizons and. These preferences are represented in the form of utility functions and reward functions, which assign numerical values to different states of the world to convey the agent's desire for a global state. Rational agents choose action based on the maximum anticipated value principle, i.e. an agent chooses to do activities that maximize the expected usefulness or reward the agent seeks to obtain. The utility function indicates if an agent is risk neutral, risk neutral or searching for risk. Services are modelled on "closed world," i.e., for the known portion of the world they are caught and have to disregard the unknown. In addition, decision theory is regulatory and defines the behavior of a rational agent. It does not describe how people are doing. Indeed, it has multiple times been shown that the decision-making processes of people often deviate from methods used through AI theories and individuals often do not make

rational decisions but instead act altruistically. Decisions taken by AI systems can be assessed by comparing them with existing best practice examples (the so-called gold standard) a technique somewhat similar to the validation on test data of machine learning algorithms. The parameters of the decision model should also be evaluated in order to discover if the decision result is sensitive to tiny changes in the assigned probability and utilities.

Any decision taken inside a business process, e.g. to purchase, sell or offer a suggestion to a customer, may be based in decision-making theoretical models. To better cope with unsafe information and find out what questions to ask about improving your world knowledge, AI systems take advantage of decision-making models. Current business trends such as personal digital assistants or cognitive computing link with theory of decision making.

3. From Decision to Action: Search Algorithms

Search algorithms in AI and math are studied to find the ideal solutions to problems of planning and planning, e.g. what activities to perform in a successful marketing campaign, how to plan a number of jobs in a number of machines to produce the product optimally, or how to plan a tour to deliver products optimally across a range of planned locations. AI has produced a number of various search algorithms, integrated in today's sophisticated optimizing approaches and issue solutions. These strategies frequently rely on a discreet model of the world, which is explained by a number of states and actions and the repercussions of these actions decide which states an agent can reach next in performing the action. The states and actions of an issue establish the search space in which the states are the nodes of the graph below and the actions explain probable transitions among the states represented by the network edges. The various powerful and discrete modelling techniques available make state-based research strategies generally useful. They were extended to very large search areas by the development of efficient coding methods for the models and the use of several ways for exploring vast search areas. In particular, uninformed and informed search tactics can be distinguished. Uninformed searches explore a search area using certain exploration tactics based on the subsequent search graph structure, while informed searches analyze the 'goodness' of a State using heuristics, and then pick which State to visit next. Properties like completeness and optimality characterize the search algorithm, i.e., if a search space exists, the algorithm finds a solution and returns an optimal solution based on certain optimizations functions.

There is no doubt that the importance of search algorithms to optimally handle business processes planning, scheduling and other challenges, and many successful applications exist in logistics, production and others.

1.2. OBJECTIVES

The goal of this research is to propose the guidelines for the use of AI in BPM systems that could be used by any organization to make its processes smarter. In order to achieve this objective, the following intermediate objectives are defined:

1. Understanding, envisioning and discussing the challenges and opportunities of moving from current, largely programmatic approaches for BPM, to emerging forms of AI- enabled BPM.
2. to propose a strategy for AI in BPM
3. to propose guidelines for the use of AI in BPM with guidelines that could be used in any particular organization to make its processes smarter
4. to identify which tools are best in approach of the use of AI in BPM

This research will also discuss how automated planning techniques (one of the oldest areas in AI) can be used to enable a new level of automation and processing support. Implementation of artificial intelligence can show significant results, particularly in attempt of to get higher profit."

1.3. STRUCTURE

This investigation encompasses in five chapters. Every chapter has a different topic.

The first chapter presents an Introduction, including the background and problem identification, specific objectives, and structure of this study. An overview and brief state-of-the-art of AI in BPM are made to provide some context to the research.

Second chapter presents Literature review where discussion on published or existing information has been reviewed and identified how this research needed to adapt existing techniques to process dimension of BPMs.

Afterwards, the chosen Methodology for this study is presented. A brief explanation of each stage is presented and their adaptation to this study is also included in the chapter.

Considering the previous information, Literature Review, a questionnaire survey has been executed. Through the output of the survey, recommendations have been proposed which are evaluated by technical and non-technical audiences.

The final chapter encompasses the conclusions of this investigation, its limitations, and future improvements to scientifical and academical contributions.

2. LITERATURE REVIEW

2.1. BPM AND AI INTERACTIONS

(Di Francescomarino & Maggi, 2020) studied "*Preface to the Special Issue on Artificial Intelligence for Business Process Management 2018*" and found that the science of artificial intelligence (AI) has rapidly expanded over the previous few years, developing and implementing diverse ways both in industry and academics in a variety of sectors. One such area is management of business processes (BPM). BPM offers novel domains for AI applications. For example, machine learning (ML) techniques were used to mine event logs from various sources—including sensor data, predicting the future of ongoing tracks of execution as well as to explain divergent behavior in business processes. Planning approaches were used for business process modelling and analysis. The development of AI can potentially be affected by BPM and related topics. The new research lines are needed in order to adapt existing techniques in order to consider the process dimension of BPMs, such as the need for continuous prediction and recommendations regarding the execution of processes. AI must be adapted to automatically automate a variety of business activities, which currently require qualified human workers. This issue of the 2018 Journal of Data Semantics is focused on BPM and AI interactions, which emphasis on the artificial intelligence for business process management.

(Ting et al., 2009) studied "*Business Process Management: A Research Overview and Analysis*" He noted that in recent years applications for business process management (BPM) have become increasingly common in response to the desire for more efficient, adaptable and effective corporate processes. Our research purpose in this work is to describe the topic of BPM research in the light of environmental and technical developments. The disparity among topic concentration and study techniques selected by BPM researchers across geographical regions is of significant concern to us. We are based on the previous Barothy, et al. (1995) study on the Business Process Reengineering, entitled 'Emergence of a New Research Field.' Our work is updated. Their research analyses BPR papers published in key MIS journals and/or produced in the area by trois promoters in line with the research and content strategy between 1988 and 1994 in order to provide initial insight into the development and state of BPR as a new field of research. For a larger research area (BPM) and for a length of time to date, we want to reproduce their experiments. The most recent overview of BPM research is presented in our work and compared to prior study findings in order to clarify the development of BPM research over the years. Carefully specified are the business processes and the associated discipline, BPM.

(Enriquez et al., 2020) studied "*Robotic Process Automation: A Scientific and Industrial Systematic Mapping Study*" and it was revealed that while robots that carry out human jobs promote thought by the name "Robotic Process Automation" (RPA), it is a software solution. A 'robot' is a software program in the context of RPA. The term RPA is a technology extrapolation of a human employee whose aim is to deal promptly and profitably with structured and repeating duties. It might be said that "RPA' is aimed at replacing people with external automation. This is different from the typical inside approach to information systems' improvement. Adopting RPA involves a minimal degree of intrusiveness according to the Institute for Robotic Process Automation and Artificial Intelligence (IRPA-AI). Regarding the cost of RPA software licenses, Capgemini indicates that the price of a full-time person can be between one third and one five. Lacity and Willcocks also believe that a robot can accomplish structured duties that equate to 2 or 5 people. In recent decades, the automation of robotic activities has become more and more attractive. Most of the literature covers theoretical foundations of RPA or industrial results only, in particular in financing and outsourcing, after implementing RPA in specific scenarios.

2.1.1 Digital Transformation

(Paschek et al., 2017) studied "*Automated business process management – in times of digital transformation using machine learning or artificial intelligence*" and noted that, from the deployment of mechanical production over the division of labor's and assembly line operations to the use of electronic and automatic production, the continuing industrial revolution has been the first three identified types of industrial review. In fact, we have reached the 4.0 phase of the industrial revolution - digitization. Behind Smart Factory, Internet of Things, Intelligent Fabrications, Cloud, Big Data, Communications between Machines and Machines and much more, the existing economy is affected by new aspects and trends. Therefore, he advises: "The conventional business model of the production sector is changing, new models are developing and incumbents have to notice these new competitive challenges quickly and respond to them." Real and virtual worlds, driven by the Internet, are increasingly becoming an internet for imports and cloud computing. On the Internet, cloud computing enables remote access to apps, services, and the management of workflows, processes, or machines. "The internet of stuff builds on this concept through the use of the cloud for storage and automating processes in devices that are synced to the internet, such Internet cars and remote lighting systems and shading systems," says Brixel. The Internet of stuff. Industry 4.0 briefly adopts procedures and process management that people usually manage internally on the cloud to adapt and analyze them from anywhere.

(Kerpedzhiev et al., 2021) studied "*An Exploration into Future Business Process Management Capabilities in View of Digitalization*" and the process orientation was deemed a recognized model for business success in organizational design. Business Process Management (BPM) is therefore continuously attracted interest from academics and practice, which deals with the implementation of process orientation. Moreover, for all stages of the BPM life cycle, sophisticated techniques and tools are accessible. In addition to lifecycle models, BPM is structured through capacity frameworks, which identify and combine those areas of capacity which are considered most critical to successful process orientation in businesses. The objective is to provide efficient and efficient business processes with an institutionalized BPM capacity, which in turn drives company success. Due to the strong relationship between BPM's maturity models, fit-to-fit analyses are facilitated and the road-map derivation and prioritizing of BPM investment has developed as an effective Management Tool. Capability frameworks also provide a shared foundation for academic discourse and a clear scope for it. Many frameworks and maturity models have therefore been suggested for BPM capabilities. Hammer's (2007) process and enterprise maturity model includes a pioneering pragmatic framework. De Bruin and Rosemann (2007), which includes 30 skill areas structured according to six of the so-called core elements of the BPM, that is, strategic alignment, governance, methods, information technology (IT), people and culture, is also one of the widely adopted academic framework plays a central role to this research work.

2.1.2 Cognitive BPM

(*(PDF) AI for augment human judgement in Business Processes Management*, n.d.) studied "*AI for augment human judgement in Business Processes Management*" Artificial Intelligence (AI) was determined to refer to a wide range of approaches and algorithms that allow software over time to enhance performance in obtaining more data. In computer science, AI research is described as "Smart Agents" study: any device that recognizes the surroundings and acts to maximize its likelihood of success. The term "artificial intelligence" is colloquially used when the computer imitates "cognitive" capabilities associated with human beings, like "apprenticeships" and "resolution of problems." AI has enormous potential to increase people's judgement. AI (in particular machine learning) must be used to support and increase human productivity in all parts of personal and professional life as an add-on to and complimentary solution. To provide the responsiveness and flexibility needed for proactive management, BPM systems must raise their level of automation. Some Artificial Intelligence (AI) researchers have, on the other hand, focused on evaluating dynamic fields, including active control over computers and physical things. In this perspective, automated planning, one of the oldest fields in AI, is designed for the automated model-based synthesis of autonomous behavior.

(Dwarkanhalli, 2018) studied "*How Cognitive Computing Unlocks Business Process Management's Performance-Enhancing Virtues*" He noted that mechanisms which can sustain growth on a scale are necessary in order to be effective in maintaining momentum in every economy. In order to obtain this status, technology support and IT administration in present and future Member States must be assessed. Moreover, it demands a seamless relationship between humans and the machine environment in which they work, while providing a continual awareness of conditions and real-time decisions in business operations. Through extension of process management from process logic to business logic, BPM gives the flexibility, agility and adaptability of developing and complex business ecosystems. A methodology for achieving cognitive BPM is described in this White Paper. The systemic method for enhancing company processes is BPM. More commonly, coherent systems go beyond people and information management. BPM professionals are investigating, recognizing, managing, optimizing and monitoring business processes that support enterprise objectives. Over the years, these activities have advanced considerably to include systems that can learn on a scale, use logic and rationality and interact organically with people. We are talking about "cognitive computing" in this extended BPM form. Cognitive computing systems are not explicitly designed but are trained as human beings (including different referred to as robot process automation, intelligent process automation, cognitive automation, cognitive agents, etc.).

(Zebec, 2019) studied "*Cognitive BPM: Business Process Automation and Innovation with Artificial Intelligence*" and noted that cognitive computing is a paraphrase for new problem-solving models that simulate the cognitive capacity of the human mind through autonomous rationalization and learning. Automation is the major objective of CBPM. The fundamental idea is to mine business data, track execution, collect information and use it to educate the cognitive system to respond automatically to business scenarios. The system learns and adapts with every new situation. The next optimal action is ultimately determined by the system itself. This modifies existing model processes fundamentally and enhances their autonomous planning and decision making, adaptable and tightly aimed at events. The results are seen in the innovation of corporate processes. This strategy leads us to truly smart companies in which data supply intelligence and, in turn, foster process automation and innovation. This research examined how much CBPM increases the performance. To this purpose, we can build on IT Business Value Research's theoretical argument, studying the impact of IT on performance. This theory is based on the company's RBV as a theoretical framework for identifying CP-impacting IT resources. During the initial assessment of the domain the literature on the subject was found to be quite small. Based on a Systemic Literature Review of CBPM (IT resources) and improved CP (performance), the empirical research lacked.

2.1.3 Transformation of RPA into IPA

(Madakam, 2019) studied "*The Future Digital Work Force: Robotic Process Automation (Rpa)*" and the fresh wave of future technology was found by Robotic Process Automation (RPA). Robotic process automation is one of the most advanced technologies in the fields of computer science, communication and electronics, mechanical engineering and IT. It's both an easy combination of hardware and software, networking and automation. The research report therefore examined the secondary data available in Google, the academic and research databases. The study lasted 6 months, i.e. from 1-1-2018 through 30-6-2018. Very few empirical publications, White Papers and RPA blogs have been located and this research manuscript has been compiled. Because of the modern phenomenon, this study is exploratory in character. Robot Process Automation, RPA, Robotics, Artificial Intelligence, Blue Prism were the terms used to search the database. The study finally found that robots and robot process automation technologies are increasingly obligatory in order to perform commercial activities throughout the world. Automation can immediately bring value to core business processes such as the salary of employees, change in employees' status, recruitment and boarding, accounts receivable and payable, processing of invoices, stock management, creation of reports, software installations, data migration and sales on boarding, etc. to name several applications. Furthermore, Robotic Process Automation has a large range of applications, such as health, pharmaceuticals, financial services, outsourcing, retail, telecommunications, energy, utilities, immovables, the FMCG, and much more.

(Chakraborti et al., 2020) studied "*From Robotic Process Automation to Intelligent Process Automation: Emerging Trends"* and noted that business operations, such as government, insurance, banking and healthcare, are an integral aspect of all industries. For example, automotive claims treatment, prescription medication order handling and patient cases administration incorporate automotive insurance processes. The industry is estimated to reach $16 trillion by 2023 for business process management (BPMs). The automation of business steps - known as Robotic Process Automation (RPA) - undergoes a drastic transition with recent developments in machine learning and artificial intelligence (AI). Transport, manufacturing, packaging, shipping, customer service, finance and health care are the businesses that are most interested in automation. As stated in "Transformation of RPA into IPA: Smart Automation Process": A new kind of tools, known as intelligent process automation, has recently emerged through the intersection of AI, automation and customer data (IPA). The idea is also reflected in market perspectives analyses by industry leaders, like PwC's recent analysis of growing RPA trends for financial industries and IBM's 2020 AI forecasting of the potential of AI-fueled

automation to revolutionize people's job. The first workshop on intelligent process automation has recently been held at AAAI, one of the top AI conferences. In this survey, we examine in more detail this emerging area of research at the interface of AI and business process automation. First of all, we start with BPM and RPA backdrop. A business process is a collection of connected tasks that can achieve a specific organizational goal or target.

2.2. REVIEW

(Koehler, 2018) studied "*Business Process Innovation with Artificial Intelligence: Levering Benefits and Controlling Operational Risks*" and found many successful applications of artificial intelligence (AI) technology and a great public interest in their effects have been observed during recent years. Many of these applications improve business process flexibility and/or efficiency, if not the implementation of whole new business models. We examine certain significant AI technologies in this article and their possible benefits and concerns in the management of business processes (BPM). Successful AI application should take careful account of both issues, i.e. the benefits offered, analyze, measure and regulate AI technology operational risk. As the business risks for AI are a new yet unnoticed difficulty for many business process professionals, we explore the operational risk technology sources in AI and identify chosen areas of concern for the business. A business process is a set of interconnected actions that has aim to achieve a certain company output or to provide value to the customers. Any human action may be modelled and studied as business processes, whether it be creative thinking, education, trade or production. Some events, such as a consumer seeking a mortgage loan, usually lead to a business process and employ data such as a customer's credit history. Data leads the business process into its objective, i.e. the approval or refusal of the loan. Today's corporate processes increasingly consider data sources, which current IT technology has made feasible.

(Heroor, 2017) studied "*Uncovering Artificial Intelligence – for Business Process Management (BPM)*" and that has been found that AI is the next major thing, yet it doesn't seem that AI is not new, but has constantly developed over the past few years with substantial gains. We are today encircled by technology driven by AI, which often very subtly attempts to aid and influence us, for example, and suggests what we might want to read, see, hear or buy. As far as businesses are concerned, AI is beginning to disrupt the way business is done in almost all areas of industry. AI systems detect and generate a great deal of information and are known as automating, learning and modifying the entire business process or workflows as they go. Today's applications span from commonplace to revolutionary, from textual information collecting, analysis and decision-making to autonomous and advanced robotic vehicles. AI helps firms to attain unprecedented levels of efficiency and quality already exceed conventional performing trade-offs. The most frequent disruption between the

anticipated advantages and the unseen operational risk of adoption of AI into business process management is that companies who are not yet embarking along their AI travel. A large field of inquiry is artificial intelligence. An artificial intelligence definition is not easy and seems to require a strong comprehension of human intellect. Thus, it is no surprise that Stuart Russell's key textbook on the AI 'Artificial Intelligence - A Modern Approach' avoids a definition of the concept and rather analyses its diverse forms of human, rational thought and behavior in the broader context.

(*How AI is helping to drive business process optimisation*, n.d.)studied "*How AI is helping to drive business process optimization*" and noticed that any IT leader has an essential duty in ensuring the seamless running of the technology that supports business activities. The CIO, a team of corporate architects and business analysts and consultants are also working to reduce IT procedures inefficient or manual via business process management wherever possible (BPM). Many technologies have gathered to provide fresh brilliance to BPM. The use of artificial intelligence (AI) for automation is one of these. The CCS Insight's newest senior management IT investment poll conducted in July reveals that 80% of companies are now testing or playing AI. The data showed that 55 percent of companies reported testing AI by a considerable increase from 2019. This paper move beyond RPA for hyper-automation lists a variety of areas that can be utilized for process automation with artificial intelligence and machine learning (ML). Firstly, continuous learning is carried out with data gathered through automation processes that are used to dynamically update models. The AI adapts to increase automation quality. The second field in which AI can be implemented is to reuse learning models already developed on similar datasets. Gartner states that such models can then be re-entered into a new customer model, reducing the time and data required for a model to be constructed and implemented. There is a close connection between BPA and AI, which is becoming more obvious as companies are trying to deal with the epidemic of coronavirus Covid-19.

(*AI-based Business Process Management in Banking – Current Use-Cases | Emerj*, n.d.) studied "*AI-based Business Process Management in Banking – Current Use-Cases*" and the Automation of Operational Management (BPM) comprises the identification, modelling, analysis, and enhancement of business processes in banking. For some processes, many banks have already some types of BPM. For example, at most banks, compliance processes tend to be subject to some type of software automation. This is because there is a lot of demand to produce cost effective processes in banking services, including compliance, fraud and risk management. For human teams, this can be exceedingly difficult to execute alone. Management of business processes is a strategy for banks to increase internal workflow efficiency. Every time a modest modification is made in the process, simple rules-based software automation must be updated. Any change in the rules involves extra costs and

resources for teams. AI approaches may assist BPM software better perform jobs over time, which enables employees to concentrate their time on more complicated activities. Harvard Business Review claims to have surveyed the application of AI to its company by thousands of managers. The survey showed that just around 8% of companies used AI in their core business processes. The results show that most companies have engaged in one-off pilot initiatives or deploy AI in a specific business process only. One of the reasons for the slower than projected AI adoption in this area is because banks do not take sufficient steps to rearrange their procedures so that they are AI-friendly. Modern leaders of banks can take some risk in order make AI friendly environment. On the other hand, traditional bank leaders avoid risk and more cautious.

(Maggi & Marrella, 2021) studied "Preface to the Special Issue *on Artificial Intelligence for Business Process Management 2019*" It was also noted that due to progress in AI and machine learning, we are in the beginning of a major shift in business process management. Indeed, the use of AI and ML has an effect on a number of application domains, including industrial engineering, IoT and emergency response, in which process management viewpoints and methodologies are relevant. The usage of AI and ML was addressed in BPM as the next disruptive technology that affects nearly all human business process tasks. In other circumstances, AI simplifies human involvement with processes considerably. In other circumstances, it will support people extensively when carrying out duties, and it will allow the complete automation of operations currently done by hand. In the course of time, AI may develop whole new business and commercial paradigms. For instance, we anticipate modelling that fundamentally relies on objective achievement and anticipate modelling that enables continuous improvement and adaptation based on experience learning instead of BPM models oriented on process or case management. This special issue of the Journal of Data Semantics' Artificial Intelligence Management 2019 focuses on the cross-play between BPM and AI.

(Sikora et al., 2019) studied "*Automation with intelligence Pursuing organization-wide reimagination*" and noticed that the unknown was constantly scared of the humans. Yet, even as children, our curiosity unmistakably forces us to look into our own bright but limited worlds. We have adjusted our concerns with the unknown: Authors and poets, such William Blake and Mary Shelley, gave way to the traditional science fiction of the 20th century, gave way to the folklore of the Br. Grimm. But the act of creation remained vital to the unknown even as nature gave way to technology. People who imagine and reimagine. The robot, which is characterized by a popular culture and contemporary stories, is partly founded in our dread of the unknown. Robots are seen as incomprehensible smart robots which herald a gloomy dystopian in the near future, both in home and at work, or are seen as digital coworkers, who help us become more human through our most boring duties by allowing us to create, cooperate and

communicate. It will detect what becomes of the robots in the near future by our ability to re-image employment, society, climate and economy. How we use intelligent automation, including robots, and how we gain from it, is up to us: human beings. The results of Deloitte's mid-2020 study shows that annual growth rate of 40.6% is expected to rise in the global market for automation technologies such as Robotic process Automation (RPA) by 2027, reaching $25.66 billion.

(Kalmijn, 2019) studied "*Applying Artificial Intelligence in existing Business Processes*" and he recognized that AI means for CxO: to drive consumer travel to more and more profound experiences and more tailored digital processes. Management of the business process (BPM) is at the point of major overhaul. Where conventional BPM focuses mostly on process effectiveness and cost reduction, the new wave drives business agility, customer (business) knowledge and digital automation. In corporate operations in which the biggest advantage is predicted, this wave aims to use artificial intelligence. The key question is: which are the most appropriate business procedures for the AI application? The use of AI and machine learning will definitely help companies become more proactive, make better decisions for the future and improve short-term consumer experience. AI generally can have a big and positive impact on how business activities are conducted, deep learning and natural language processing. But how does machine learning manage ever-changing legislation and policies? transparency and conformity? Can machine learning itself produce the anticipated commercial value? The answer is obvious: no! AI thinks in essence similarly to people. But two other techniques of combining computers are usually designated for people to perform intellectual tasks: 1. employing knowledge of data and 2. using knowledge from experts. Machine and profound learning are essentially the data and predictions on the basis of past data in the form of learning. It provides what we refer to as data knowledge. Predictions are particularly useful as it provides us with knowledge about client behavior, voice and vision interpretation. However, the forecast is not a choice and is not predictable, cannot be explained, and cannot actually be audited.

(Sharma, 2020) studied "*How artificial intelligence is rewriting the BPM rulebook*" Artificial Intelligence (AI) has been shown to penetrate into many aspects of business: from the corporate strategy to interactions with customers, research and development of new products, among other fields. However, the way we design and manage our operating business processes might completely change one of the lesser-known applications for AI. Any significant corporate operation has always been centered on optimizing its business process management (BPM). Now we are at a vital – possibly quite scary – tipping point: cost-effectiveness is increasing when it comes to the implementation of cognitive robotic process automation for basic functions than interns and junior personnel. As AI gets ever more economic, while sophistication is also growing, companies should expect a new era for BPM. AI starts

to make an increasing impact at all BPM levels, from lower functional tasks and process automation to the highest levels of company reorganization and policy-making. In addition, the impact of AI is already obvious in certain industries. For example, a medical insurer that processes claim from various service providers in hospitals. We see AI helping them "reach the points," and identify which claims relate to what visit a hospital customer is, and finally create a clearer image of the hospital stay of a patient. These ideas all originate from price, changing the way medical service providers claim, increasing customer experiences by familiarizing themselves with their consumers.

(De Almeida Bordignon et al., 2018) studied "*Natural Language Processing in Business Process Identification and Modeling: A Systematic Literature Review*" and found that in recent years, increased attention has been paid to business process management (BPM). Since they began to recognize its potential for cost reduction, improvement of productivity and improvement of quality, many companies have adapted their operations to a process-centered perspective. However, it takes time to integrate BPM within enterprises and automate process identification and discovery. In order to meet this expectation, it was possible to apply the techniques and tools of natural language processing (NLP) to create process models from unstructured texts. In this article the author gives the results of a comprehensive assessment of literature carried out to prepare and analyze natural language texts aimed at extracting business processes and ensuring the quality of the processes. The paper includes strategies for process identification, process discovery and process analysis as well as technologies to enable process discovery in the BPM life cycle phases.

3. RESEARCH METHODOLOGY

As the desired output of this research to propose guidelines by emerging AI techniques in business process, this chapter outlines the research approach chosen to answer research questions based on defined research aims for this research project. A study approach chosen by a researcher is affected by different elements. These include the researchers' opinions, the nature of the research challenge, the state of scientific research and theories if the issue is relevance. In research, a quantitative technique is generally best used if a theory has been tested, or if factor influencing the results has been identified or predicted. The methodology selected for this investigation was based on these results. The methodology of research plays an important role in research projects.

Figure 1- Research Methodology

Research Planning

The first step is Research planning. Topic of this research has been chosen. Preliminary research has been done for information. Locate the material and evaluate the sources. Which survey needs to execute. A proposal has been prepared in order to discussed and describe goal and objective.

Research Design

In order to integrate the different components of the study such as survey, questions, questionnaire, overall strategy has planned. How survey has been executed. How data has been collected and analyzed further.

Research Development

The concept of research calls for a "data collection and analysis" method that supports researchers in answering research questions and achieving research objectives. It is usually objective since each researcher is different, and hence the chosen research methodologies for each researcher are diverse.

Primary and secondary data sources have been collected. This online survey provide data on the national and regional landscape of legislation and policies of AI and Intellectual property in the United Kingdom. The personal information of the participants has not been made public.

In order to minimize the impact of the trade-offs, an enterprise-wide exercise is performed which involves data cleansing, and feature engineering (Paradis, O'Brien, Nimmon, Bandiera, & Martimianakis, 2016). Since complex and big data is not necessary to start running the AI model, but it is the quality of the data that is important. For initial testing, a simple method such as surveys can be employed as long as the data avoids bias. To propose guidelines for the use of AI in BPM, sending online surveys through sending emails with questionnaires to AI and BPM experts is more appropriate as it gives the respondent enough time to answer all the questions as they require documentation consultation. The email addresses of these experts can be sourced from the website of their websites or from online publications. The questionnaire should ask relevant questions and avoid bias. Thereafter the responses are validated by technical or non-technical participants.

In each of these stages, we need to apply some basic requirements for trustworthy AI systems. Different stages of this process require different guidelines to make the system trustworthy (Teherani , Martimianakis, Stenfors-Hayes, Wadhwa, & Varpio, 2015). For example, data must be unbiased. The questionnaire model should be designed with privacy and security built in and proper access controls. Testing should be done with real data. And with a diverse group of people as much as possible.

Monitoring should be continuous, and alerts generated on unexpected behavior. From a non-technical perspective, we need the right regulations, code of conduct for developers as well as designers, possible standardization, certification, accountability, education to foster an ethical mindset, stakeholder participation and diversity of teams. Based on all this, the AI trustworthiness framework, it is possible to a list of items to be validated against the AI system to make sure the AI being built is trustworthy system.

Data Collection

Data gathering is seen as a systemic method for collecting and measuring specified variables values that are respond by participant and evaluate the findings. Questionnaire is a typical method of gathering data when a good deal is gathered. This survey can be designed in different ways but consist of two components:

- “Questions”
- “Responses”

We have prepared the questions for the ***"Guidelines for the use of AI in BPM systems"*** survey and make a survey to find answers. In a database the data gathered are stored in an orderly way.

Research Data Analysis

Data Analysis has done through SPSS. The results are descriptive and quantitative. Data Analysis has done on respondent's data after the questionnaires and survey have been completed and obtained from each respondent. The findings have compiled using data editing, data sorting, and data coding to establish relationships. The data has then been checked to verify the existence of missing data and to ensure the proper analyzed. The data obtained has evaluated qualitatively and quantitatively while describing and summarizing the findings. Descriptive and inferential statistics has used to evaluate the results. The main variables are summarized by means, median, maximum, minimum and standard deviation.

4. RECOMMENDATIONS

The literature review allowed the acknowledge of the currently existing and main ways to use AI in BPM systems. A new survey is needed to adapt existing techniques to consider the process dimension of BPMs, such as the need for continuous prediction and recommendations regarding the execution of processes. This section includes how survey has been designed, executed, and analyzed. According to the survey analysis, guidelines has been proposed.

4.1. SURVEY DESIGN

A questionnaire survey has been designed by creating a set of questions to collect required information. Within the three broad types of survey studies one can further distinguish their design by time period, respondent group, variable choice, data collection and analytical method. These survey design options are described below.

- Time Period – Surveys can take on a cross-sectional or longitudinal design based on the time period involved. In cross-sectional design the survey takes place at one point in time giving a snapshot of the participant responses.
- Respondent Group – Surveys can involve a single or multiple cohorts of respondents. With multiple cohorts they are typically grouped by some characteristics for comparison such as age, sex, or eHealth use status.
- Variable Choice – In quantitative surveys one needs to define the dependent and independent variables being studied. A dependent variable refers to the perceived outcome that is measured, whereas an independent variable refers to a respondent's characteristic.
- Data Collection – Surveys can be conducted by questionnaire or by interview with structured, semi-structured or non-structured questions. Questionnaires can be administered by postal mail, telephone, e-mail, or through a website. Interviews can be conducted in-person or by phone individually or in groups. Pretesting or pilot testing of the instrument should be done with a small number of individuals to ensure its content, flow and instructions are clear, consistent, appropriate, and easy to follow. Usually there are one or more follow-up reminders sent to increase the response rate.

4.2. SURVEY EXECUTION

Conditions are met to propose the guidelines for an AI associated smart process or recommendations to help users and service providers to transforming their traditional business process to automate one. This research will help to select the most adequate technologies to be recommended.

Surveys serve a variety of purposes -- figuring out what constituents want; how different people respond to questions and may suggest their solutions. Executing a successful survey is not difficult if you put a lot of thought into its format and questions beforehand and can reveal important (and often surprising) information. Choosing the right parameters, format, and length can make your survey a success and bring you the information you need.

Steps involved:

1. Understanding of the problem
2. Designing the questionnaire depending upon the problem and variables
3. Determining the target audiences or respondents: Target audience is Executive (CEO,COO,CFO), Process practitioner/ Lean/Six Sigma Business Analyst, IT Manager, AI Engineer, BPM Student, BPM Consultant, Vendor Representative of different organizations.
4. Sending the designed questionnaire to the target audience via various methods like email, google forms, WhatsApp etc. And collect their responses.
5. Analyzing the collected data to get the desired results
6. Depending upon the results we can produce some suggestions.

Here are result of survey executed. Data is presented in form of tables and figures for better understanding.

Q1: Where is your organization located

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	EU	24	30.0	30.0	30.0
	UK	15	18.8	18.8	48.8
	USA	11	13.8	13.8	62.5
	ASIA	21	26.3	26.3	88.8
	Other	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 1- Where is your organization located

From the analysis and the details mentioned in the above graph/ tables and it states that the sample data is concerned about 80 respondents. In this it was observed about - "Where is your organization located" 24(30%) respondents responded EU, 15(18.75%) respondents responded UK, 11(13.75%) respondents responded USA and 21(26.25%) respondents responded ASIA and 9(11.25%) respondents responded Other.

Q2: Which of the following best describes your job function

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Executive (CEO,COO,CFO)	4	5.0	5.0	5.0
	Process practitioner/ Lean/Six Sigma Business Analyst	14	17.5	17.5	22.5
	IT Manager	16	20.0	20.0	42.5
	AI Engineer	16	20.0	20.0	62.5
	BPM Student	9	11.3	11.3	73.8
	BPM Consultant	12	15.0	15.0	88.8
	Vendor Representative	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 2- Which of the following best describes your job function

From the analysis and the details mentioned in the above graph/ tables, it states that the sample data is concerned about 80 respondents. In this it was observed about - “Which of the following best describes your job function”. We can see most of the responded are IT manager and AI engineers. It is useful as some of them already have experience in the AI driven BPM.

Q3: Which of the following best describes your organization’s size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Large (2000 or more employees)	22	27.5	27.5	27.5
	Medium (500 to 1999 employees)	28	35.0	35.0	62.5

	Small (under 500 employees)	30	37.5	37.5	100.0
	Total	80	100.0	100.0	

Table 3- Which of the following best describes your organization's size

Figure 2- Which of the following best describes your organization's size

Based on assumption, we classified organization size into three sections. Company having less than 500 are considered small and most of respondents are in small organization.

Q4: Which of the following best describes your industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manufacturing	4	5.0	5.0	5.0
	IT (software/ Hardware)	10	12.5	12.5	17.5
	Healthcare	8	10.0	10.0	27.5
	Entertainment	6	7.5	7.5	35.0
	Telecom	18	22.5	22.5	57.5
	Banking	7	8.8	8.8	66.3
	Professional/Business Services/Consulting	22	27.5	27.5	93.8
	Sales & Marketing (Digital and Manual)	5	6.3	6.3	100.0
	Total	80	100.0	100.0	

Table 4- Which of the following best describes your industry

Figure 3- Which of the following best describes your industry

Most of the respondents are Professional/Business Services/Consulting profession. It is important to know in which sector or industry people belongs, which are providing their view for this research.

Q5: What are the major business drivers causing your organization to focus on business process change

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Need to save money by reducing costs and/or improving productivity	24	30.0	30.0	30.0
	Need to improve existing products, create new products or enter new lines of business to remain competitive	9	11.3	11.3	41.3
	To automate business complex processes by developing a dynamic	17	21.3	21.3	62.5

	technology environment				
	Need to improve customer satisfaction to remain competitive	12	15.0	15.0	77.5
	To improve work efficiency and quality	10	12.5	12.5	90.0
	Any Other	8	10.0	10.0	100.0
	Total	80	100.0	100.0	

Table 5- What are the major business drivers causing your organization to focus on business process change

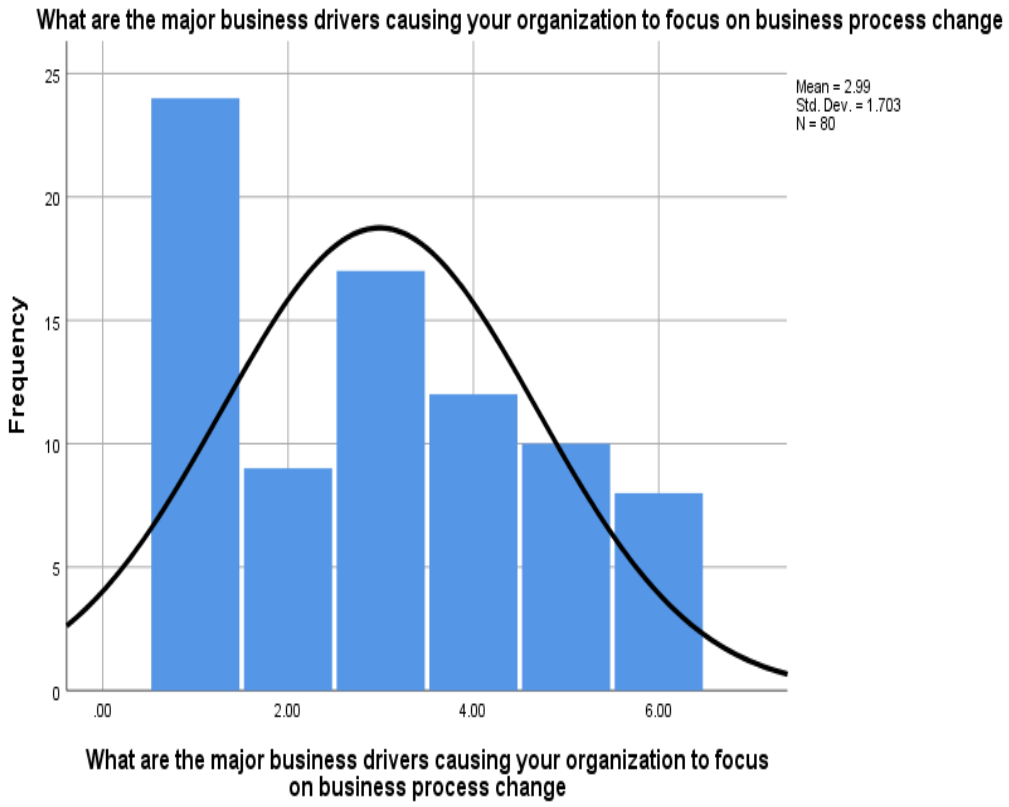

Figure 4- What are the major business drivers causing your organization to focus on business process change

This question is referenced from (*Business Processes and Change - Reasons, Drivers, and Considerations*, n.d.) to get information of major business drivers causing your organization to focus on business process change.

From the analysis and the details mentioned in the above graph/ tables and it states that the sample data is concerned about 80 respondents. In this it was observed about - "What are the major business drivers causing your organization to focus on business process change" 24(30%) respondents responded Need to save money by reducing costs and/or improving productivity, 9(11.25%) respondents responded Need to improve existing products, create new products or enter new lines of business to remain competitive, 17(21.25%) respondents responded To automate business complex processes by developing a dynamic technology environment and 12(15%) respondents responded Need to improve customer satisfaction to remain competitive and 10(12.5%) respondents responded To improve work efficiency and quality.

Q6: Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currently.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, more than one	29	36.3	36.3	36.3
	Yes, we are engaged in one major transformation project	35	43.8	43.8	80.0
	No	16	20.0	20.0	100.0
	Total	80	100.0	100.0	

Table 6- Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currently

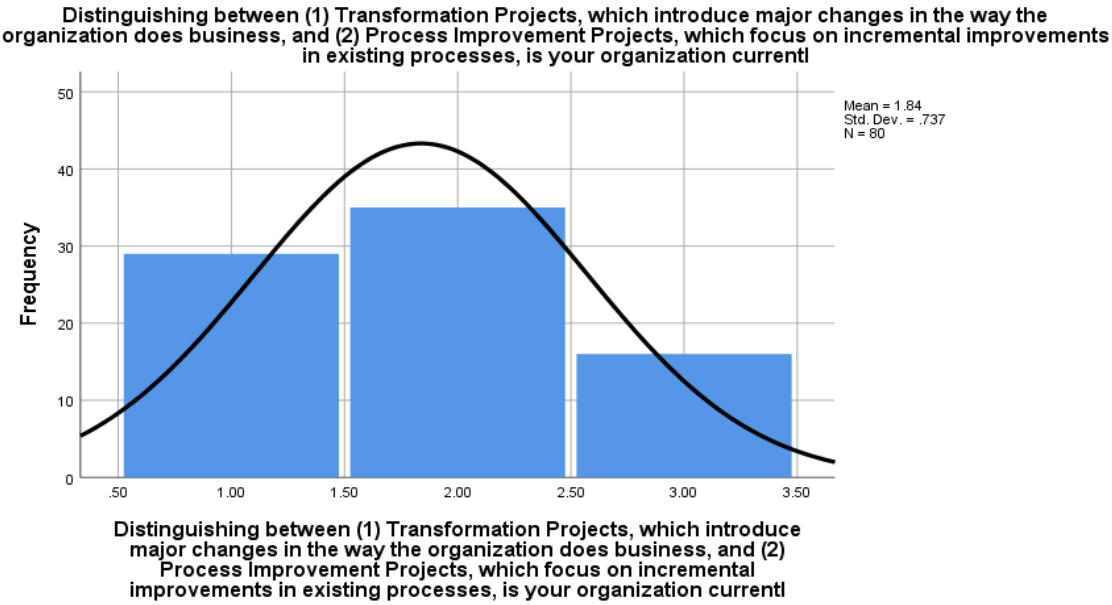

Figure 5- Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currently

Majority of people agrees to Transformations projects, which means their organization is more focusing on major changes currently. No means, in their organization Process Improvement Projects are going on.

29(36.25%) respondents responded as Yes, more than one, and 35(43.75%) respondents responded as Yes, we are engaged in one major transformation project, whereas 16(20%) respondents responded as No.

Q7: Do you believe there are strategies for AI in BPM systems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	7	8.8	8.8	8.8
	Agree	32	40.0	40.0	48.8
	Neutral	20	25.0	25.0	73.8
	Disagree	14	17.5	17.5	91.3
	Strongly Disagree	7	8.8	8.8	100.0
	Total	80	100.0	100.0	

Table 7- Do you believe there are strategies for AI in BPM systems

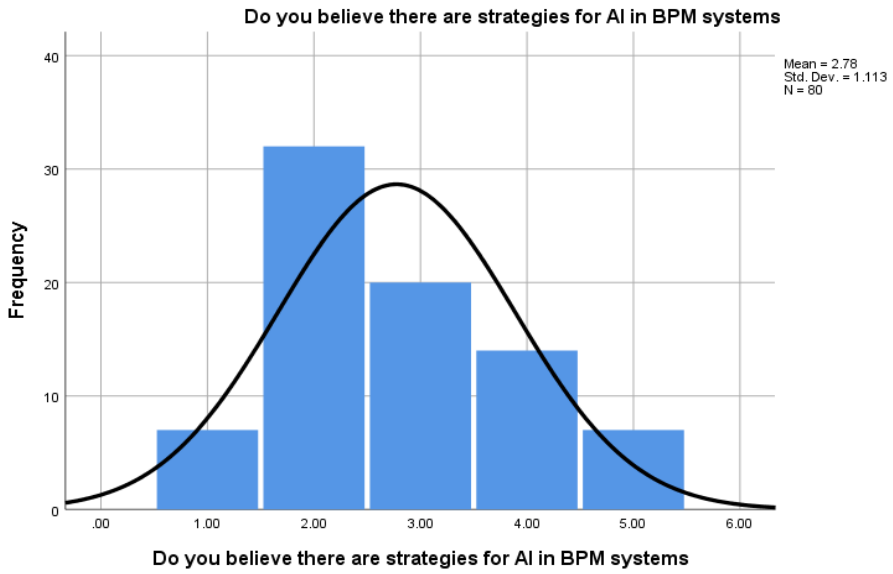

Figure 6- Do you believe there are strategies for AI in BPM systems

To know the view of people if they believe strategy are already out there or no, to have AI in BPM, this question has been added. Maximum people 32(40%) respondents say Agree, 20(25%) respondents responded Neutral and 14(17.5%) respondents responded Disagree and 7(8.75%) respondents responded Strongly Disagree.

Q8: How would you describe the overall focus of your organization at this time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Focused on improving specific departmental level processes	9	11.3	11.3	11.3
	Focused on automating departmental or enterprise wide processes	25	31.3	31.3	42.5
	Focused on incrementally improving existing processes	20	25.0	25.0	67.5

	Focused on redesigning enterprise wide processes	11	13.8	13.8	81.3
	Focused on defining an enterprise wide process architecture/ measurement system	9	11.3	11.3	92.5
	Focused on defining an enterprise wide process management/ governance system	6	7.5	7.5	100.0
	Total	80	100.0	100.0	

Table 8- How would you describe the overall focus of your organization at this time

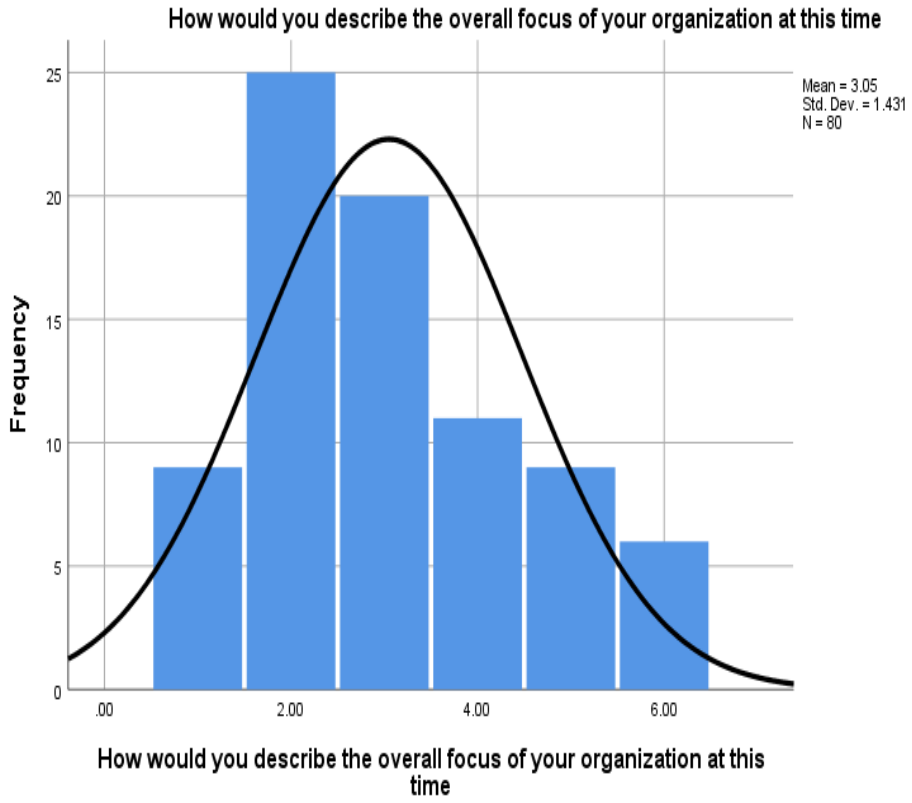

Figure 7- How would you describe the overall focus of your organization at this time

This is interesting to know how the focus may change according to size of the organization. Maximum respondents 25(31.25%) responds they focused on automating departmental or enterprise-wide processes and least interest on defining an enterprise-wide process management/ governance system. This shows more people wants to increase their business efficiency by automate their process.

Q9: What general trends in technology have had the most impact on the way you do business process work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cloud computing	5	6.3	6.3	6.3
	Mobile technologiesv	24	30.0	30.0	36.3
	Digital transformationv	20	25.0	25.0	61.3
	Artificial intelligence or cognitive transformation	6	7.5	7.5	68.8

	Embedded collaboration capabilities	4	5.0	5.0	73.8
	Embedded process analytic capabilities	12	15.0	15.0	88.8
	Industry 4.0/Internet of Things	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 9- What general trends in technology have had the most impact on the way you do business process work

Figure 8- What general trends in technology have had the most impact on the way you do business process work

The response that we get is mobile technology is the most general trend that is going on now days. In this it was observed about. 5(6.25%) respondents responded Cloud computing, 24(30%) respondents responded Mobile technologies, 20(25%) respondents responded Digital transformation and 6(7.5%) respondents responded Artificial intelligence or cognitive transformation and 4(5%) respondents responded Embedded collaboration capabilities and 12(15%) respondents responded Embedded process analytic capabilities and 9(11.25%) respondents responded Industry 4.0/Internet of Things.

Q10: Do you think AI is revolutionizing the business process management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	49	61.3	61.3	61.3
	No	31	38.8	38.8	100.0
	Total	80	100.0	100.0	

Table 10- Do you think AI is revolutionizing the business process

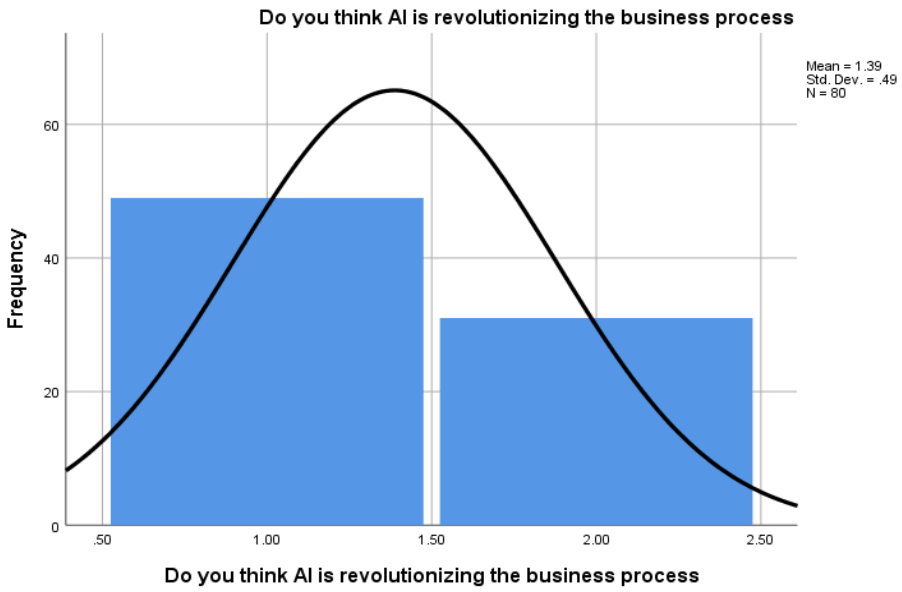

Figure 9- Do you think AI is revolutionizing the business process

49(61.25%) respondents responded as yes as AI is revolutionizing BPM, whereas 31(38.75%) respondents responded as No.

Q11: In general, would you say that AI(Artificial Intelligence) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	29	36.3	36.3	36.3
	Agree	20	25.0	25.0	61.3
	Don't Know	14	17.5	17.5	78.8
	Disagree	10	12.5	12.5	91.3
	Strongly Disagree	7	8.8	8.8	100.0
	Total	80	100.0	100.0	

Table 11- In general, would you say that AI(Artificial Intelligence) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction

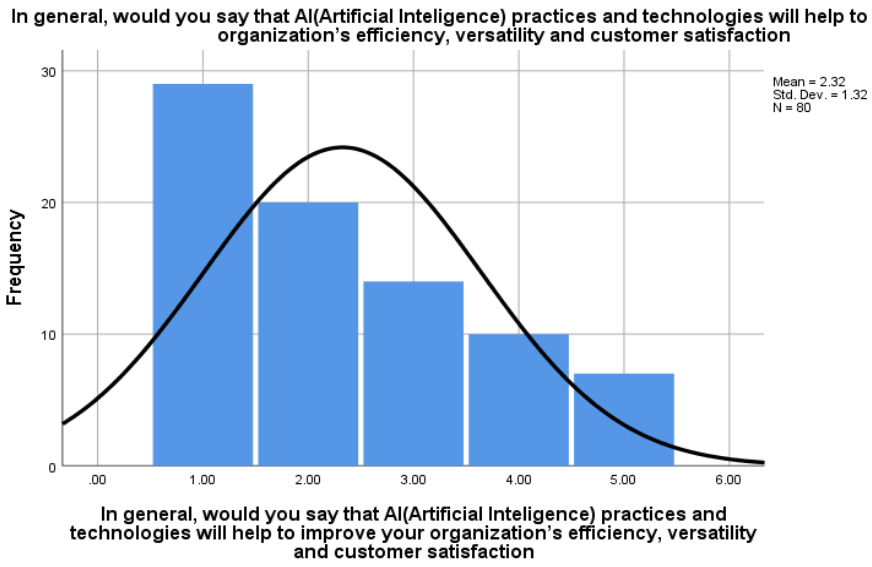

Figure 10- In general, would you say that AI(Artificial Inteligence) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction

29(36.25%) respondents responded Strongly agree and 10(12.5%) respondents responded Disagree and 7(8.75%) respondents responded Strongly Disagree that AI practices and technologies improve your organization's efficiency. It increased customer satisfaction by delivering business value.

Q12: What business process initiatives related to AI are underway in your organization this year

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Development of an Enterprise Process Architecture	15	18.8	18.8	18.8
	Development of an Enterprise Process Performance Measurement System	12	15.0	15.0	33.8
	Internet of Things	16	20.0	20.0	53.8
	Digital transformation	27	33.8	33.8	87.5
	None	10	12.5	12.5	100.0
	Total	80	100.0	100.0	

Table 12- What business process initiatives related to AI are underway in your organization this year

Figure 11- What business process initiatives related to AI are underway in your organization this year

From the analysis and the details mentioned in the above graph/ tables and it states that the sample data is concerned about 80 respondents. In this it was observed about - "What business process initiatives related to AI are underway in your organization this year" 15(18.75%) respondents responded Development of an Enterprise Process Architecture, 12(15%) respondents responded Development of an Enterprise Process Performance Measurement System, 16(20%) respondents responded Internet of Things and 27(33.75%) respondents responded Digital transformation and 10(12.5%) respondents responded None.

Q13: Do you think using AI is trustworthy and secure for Business process change

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	39	48.8	48.8	48.8
	No	30	37.5	37.5	86.3
	Not sure	11	13.8	13.8	100.0
	Total	80	100.0	100.0	

Table 13- Do you think using AI is trustworthy and secure for Business process change

39(48.75%) respondents responded as Yes, and 30(37.5%) respondents responded as No, whereas 11(13.75%) respondents responded as Not sure. Most of the people believed that AI can be trusted and secure.

Q14: What obstacle or challenge do you think you may face as you try to gain acceptance of AI in your organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Senior management isn't interested or is focused elsewhere	13	16.3	16.3	16.3
	Management wants ROI estimates that we cannot produce	14	17.5	17.5	33.8
	We have multiple process change efforts competing for attention	20	25.0	25.0	58.8
	We have had process projects that failed and management is cautious	13	16.3	16.3	75.0
	Management does not want to make the investment at this time	20	25.0	25.0	100.0
	Total	80	100.0	100.0	

Table 14- What obstacle or challenge do you think you may face as you try to gain acceptance of AI in your organization

From the analysis and the details mentioned in the above graph/ tables and it states that the sample data is concerned about 80 respondents. In this it was observed about - "What obstacle or challenge do you think you may face as you try to gain acceptance of AI in your organization" 13(16.25%) respondents responded Senior management isn't interested or is focused elsewhere, 14(17.5%) respondents responded Management wants ROI estimates that we cannot produce, 20(25%) respondents responded We have multiple process change efforts competing for attention and 13(16.25%) respondents responded We have had process projects that failed and management is

cautious and 20(25%) respondents responded Management does not want to make the investment at this time.

Q15: How has your organization's level of interest in the use of AI in BPM practices changed over the past two years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grown rapidly	17	21.3	21.3	21.3
	Grown modestly	21	26.3	26.3	47.5
	Unchanged	12	15.0	15.0	62.5
	Declined modestly	19	23.8	23.8	86.3
	Declined rapidly	11	13.8	13.8	100.0
	Total	80	100.0	100.0	

Table 15- How has your organization's level of interest in the use of AI in BPM practices changed over the past two years

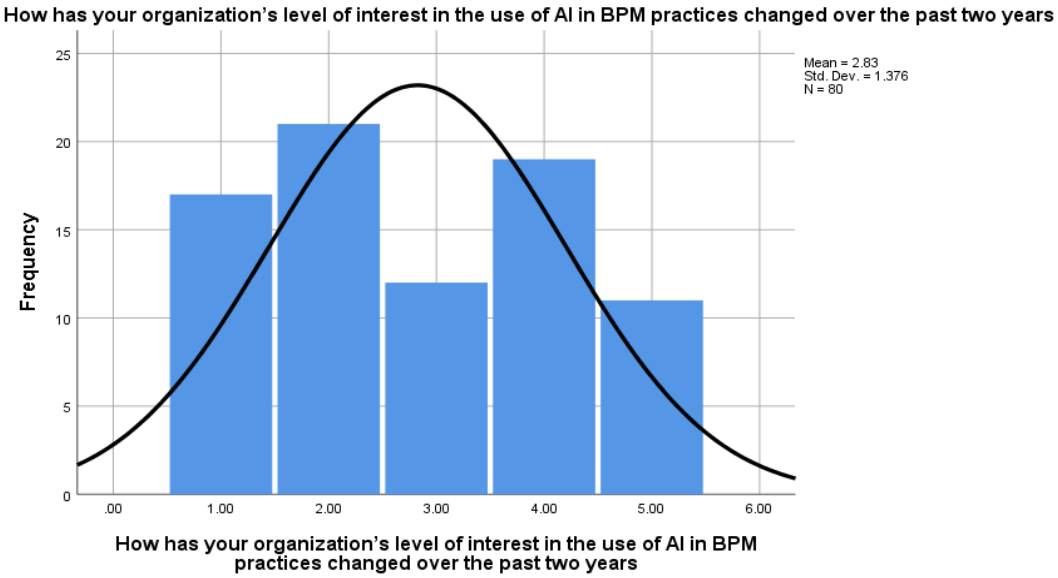

Figure 12- How has your organization's level of interest in the use of AI in BPM practices changed over the past two years

The use of AI in BPM practices changed over the past two years 17(21.25%) respondents responded Grown rapidly, 21(26.25%) respondents responded Grown modestly, 12(15%) respondents responded Unchanged and 19(23.75%) respondents responded Declined modestly and 11(13.75%) respondents responded Declined rapidly.

Q16: Are you currently using any software tools to model the processes you are trying to transform or automate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	49	61.3	61.3	61.3
	no	31	38.8	38.8	100.0
	Total	80	100.0	100.0	

Table 16- Are you currently using any software tools to model the processes you are trying to transform or automate

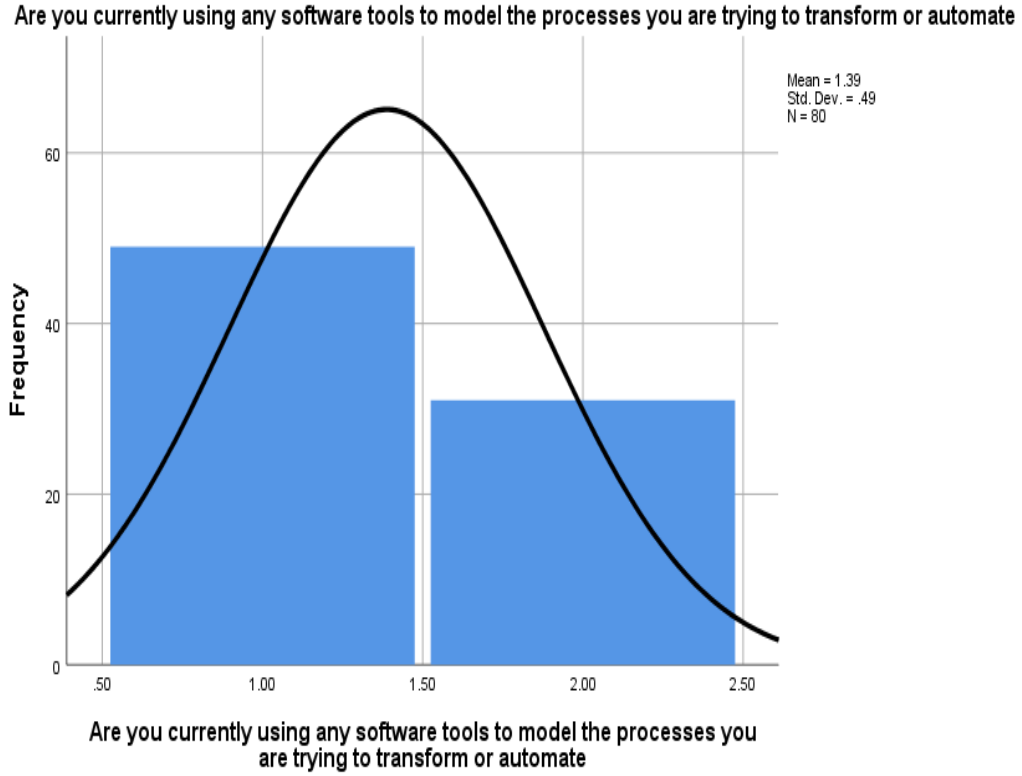

Figure 13- Are you currently using any software tools to model the processes you are trying to transform or automate

From the analysis of question “Are you currently using any software tools to model the processes you are trying to transform or automate" 49(61.25%) respondents responded as yes, whereas 31(38.75%) respondents responded as no. Please note for this question only concentrate on modeling not analyzing, monitoring and implementation of data models.

Q17: If you're using software tools to model your process change efforts, in which of the following areas are they most helpful

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Easing business complexity	29	36.3	36.3	36.3
	Enhancing collaboration	8	10.0	10.0	46.3
	Improving internal and external process interactions	14	17.5	17.5	63.8
	Process execution	13	16.3	16.3	80.0
	Process optimization	16	20.0	20.0	100.0
	Total	80	100.0	100.0	

Table 17- If you're using software tools to model your process change efforts, in which of the following areas are they most helpful

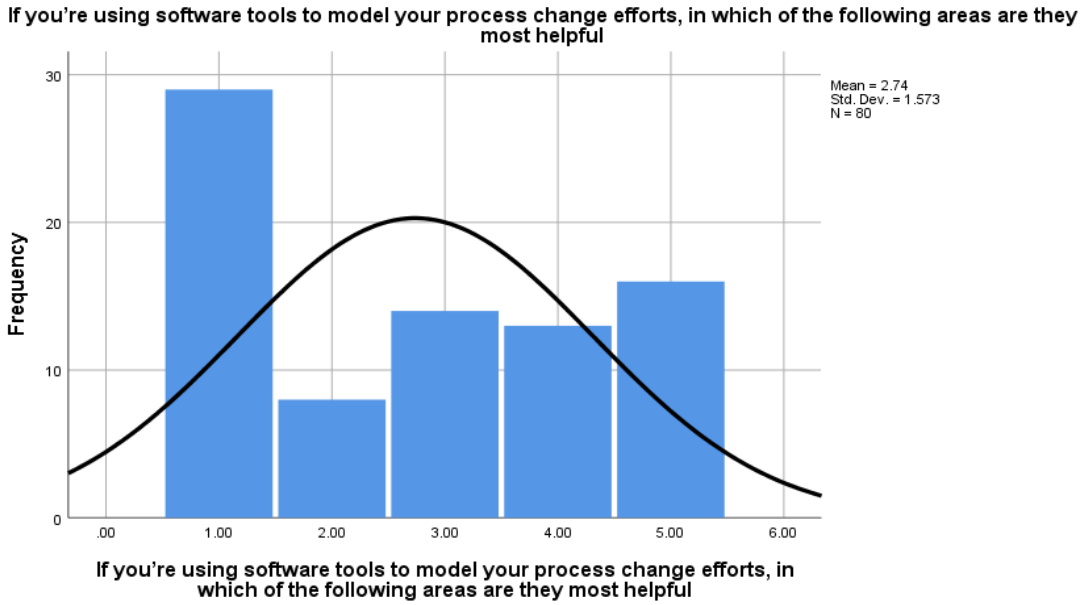

Figure 14- If you're using software tools to model your process change efforts, in which of the following areas are they most helpful

From the analysis and the details mentioned in the above graph/ tables and it states that the sample data is concerned about 80 respondents. In this it was observed about - "If you're using software tools to model your process change efforts, in which of the following areas are they most helpful" 29(36.25%) respondents responded Easing business complexity, 8(10%) respondents responded

Enhancing collaboration, 14(17.5%) respondents responded Improving internal and external process interactions and 13(16.25%) respondents responded Process execution and 16(20%) respondents responded Process optimization.

Q18: If you're using software tools to model your process change efforts, how satisfied are you with your tools' administration, user management, and security capabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very satisfied	12	15.0	15.0	15.0
	Satisfied	21	26.3	26.3	41.3
	Neutral	26	32.5	32.5	73.8
	Unsatisfied	12	15.0	15.0	88.8
	Very unsatisfied	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 18- If you're using software tools to model your process change efforts, how satisfied are you with your tools' administration, user management, and security capabilities

Graph: 4.18

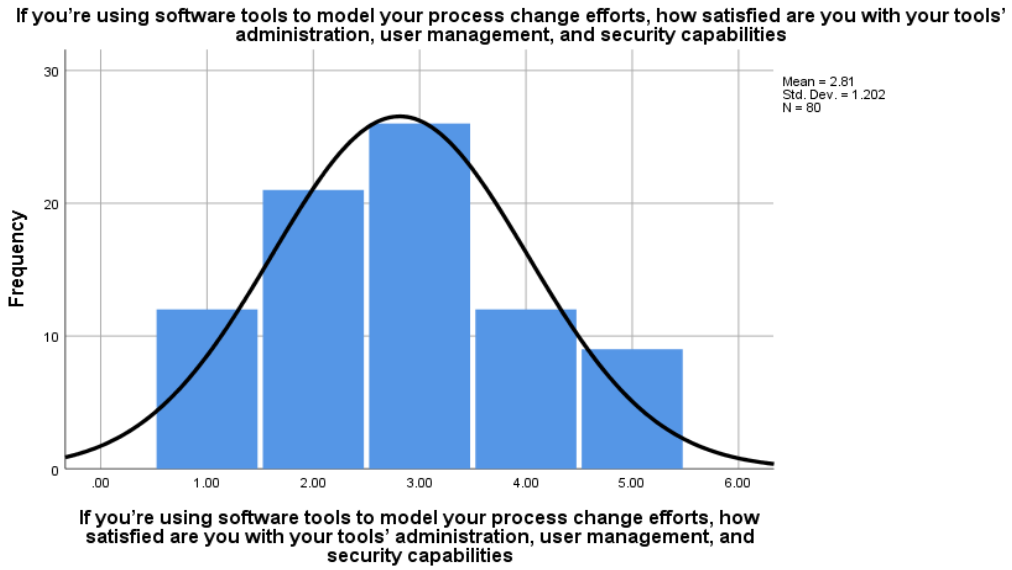

Figure 15- If you're using software tools to model your process change efforts, how satisfied are you with your tools' administration, user management, and security capabilities

From the analysis and the details mentioned in the above graph/ tables and it states that the sample data is concerned about 80 respondents. In this it was observed about - "If you're using software tools to model your process change efforts, in which of the following areas are they most helpful" 29(36.25%) respondents responded Easing business complexity, 8(10%) respondents responded Enhancing collaboration, 14(17.5%) respondents responded Improving internal and external process

interactions and 13(16.25%) respondents responded Process execution and 16(20%) respondents responded Process optimization.

Q19: Which are main areas, where the software should be more effective

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Redundant task automation	6	7.5	7.5	7.5
	Predictive analysis	9	11.3	11.3	18.8
	Cost effective	21	26.3	26.3	45.0
	Security	9	11.3	11.3	56.3
	Decision making	23	28.8	28.8	85.0
	All of above	12	15.0	15.0	100.0
	Total	80	100.0	100.0	

Table 19- Which are main areas, where the software should be more effective

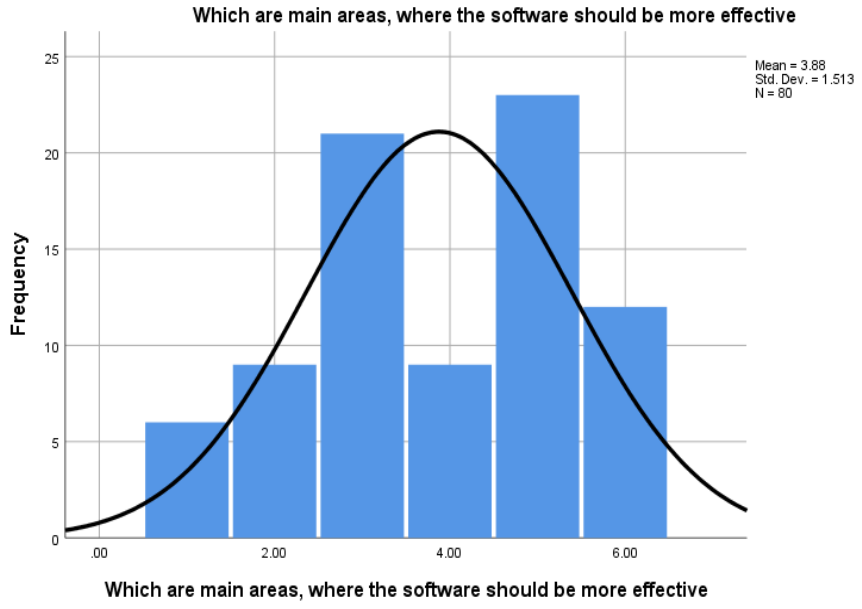

Figure 16- Which are main areas, where the software should be more effective

From the analysis and the details mentioned in the above graph/ tables and it states that the sample data is concerned about 80 respondents. In this it was observed about - "Which are main areas, where the software should be more effective" 6(7.5%) respondents responded Redundant task automation,

9(11.25%) respondents responded Predictive analysis, 21(26.25%) respondents responded Cost effective and 9(11.25%) respondents responded Security and 23(28.75%) respondents responded Decision making.

Q20: Which are best AI based tools seems more appropriate for your organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Google AI Platform	24	30.0	30.0	30.0
	Microsoft Azure	30	37.5	37.5	67.5
	Wipro HOLMES	13	16.3	16.3	83.8
	Infosys NIA	13	16.3	16.3	100.0
	Total	80	100.0	100.0	

Table 20- Which are best AI based tools seems more appropriate for your organization

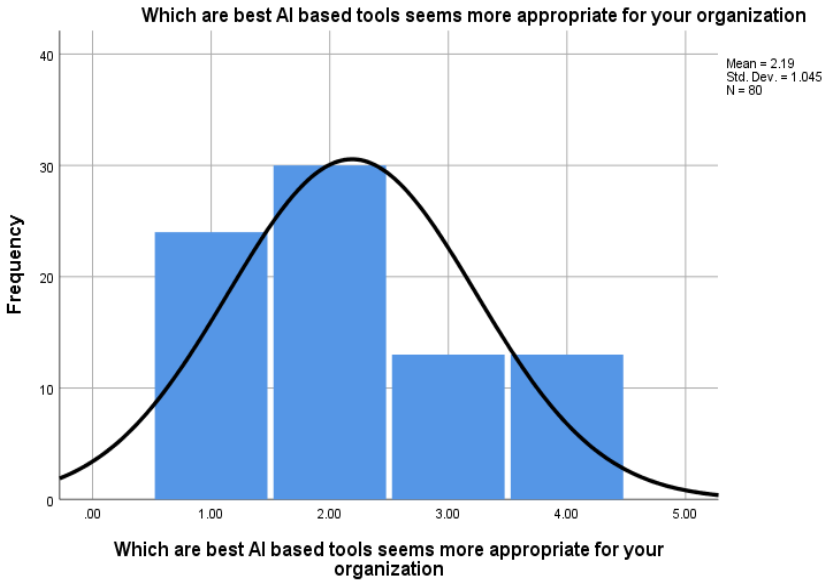

Figure 17- Which are best AI based tools seems more appropriate for your organization

Top 4 list of tools options are selected by searching on google. From the analysis and the details mentioned in the above graph/ tables and it states that 24(30%) respondents responded Google AI Platform, 30(37.5%) respondents responded Microsoft Azure and 13(16.25%) respondents responded Wipro HOLMES whereas 13(16.25%) respondents responded Infosys NIA.

Table –4.21: T test

The one-sample t-test is a statistical hypothesis test used to determine whether an unknown population mean is different from a specific value however in our case we took specific value 0. A t-

value of 0 defines that the sample results exactly equal the null hypothesis. If the difference between the sample data and null hypothesis increases, the absolute value of t-value increases.

One-Sample Statistics	Mean	Std. Deviation	Std. Error Mean	t	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Where is your organization located	2.7000	1.42669	0.15951	16.927	2.70000	2.3825	3.0175
Which of the following best describes your job function	4.0500	1.76391	0.19721	20.536	4.05000	3.6575	4.4425
Which of the following best describes your organization's size	2.1000	0.80505	0.09001	23.332	2.10000	1.9208	2.2792
Which of the following best describes your industry	4.9750	2.04985	0.22918	21.708	4.97500	4.5188	5.4312
What are the major business drivers causing your organization to focus on business process change	2.9875	1.70252	0.19035	15.695	2.98750	2.6086	3.3664

Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currentl	1.8375	0.73680	0.08238	22.306	1.83750	1.6735	2.0015
Do you believe there are strategies for AI in BPM systems	2.7750	1.11350	0.12449	22.290	2.77500	2.5272	3.0228
How would you describe the overall focus of your organization at this time	3.0500	1.43112	0.16000	19.062	3.05000	2.7315	3.3685
What general trends in technology have had the most impact on the way you do business process work	3.6500	1.89670	0.21206	17.212	3.65000	3.2279	4.0721

Do you think AI is revolutionizing the business process	1.3875	0.49025	0.05481	25.314	1.38750	1.2784	1.4966
In general, would you say that AI(Artificial Inteligence) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction	2.3250	1.31952	0.14753	15.760	2.32500	2.0314	2.6186
What business process initiatives related to AI are underway in your organization this year	3.0625	1.32497	0.14814	20.674	3.06250	2.7676	3.3574
Do you think using AI is trustworthy and secure for Business process change	1.6500	0.71334	0.07975	20.689	1.65000	1.4913	1.8087
What obstacle or challenge do you think you may face as you try to gain acceptance of AI in your organization	3.1625	1.40923	0.15756	20.072	3.16250	2.8489	3.4761

How has your organization's level of interest in the use of AI in BPM practices changed over the past two years	2.8250	1.37588	0.15383	18.365	2.82500	2.5188	3.1312
Are you currently using any software tools to model the processes you are trying to transform or automate	1.3875	0.49025	0.05481	25.314	1.38750	1.2784	1.4966
If you're using software tools to model your process change efforts, in which of the following areas are they most helpful	2.7375	1.57306	0.17587	15.565	2.73750	2.3874	3.0876
If you're using software tools to model your process change efforts, how satisfied are you with your tools' administration, user management, and security capabilities	2.8125	1.20225	0.13442	20.924	2.81250	2.5450	3.0800

Which are main areas, where the software should be more effective	3.8750	1.51261	0.16911	22.913	3.87500	3.5384	4.2116
Which are best AI based tools seems more appropriate for your organization	2.1875	1.04450	0.11678	18.732	2.18750	1.9551	2.4199

Table 21- T test

The statistical test for the various statements was performed using SPSS. The observations states that there is a statistically significant probability that the relationship between the two variables exists and is not due to chance, and reject the null hypothesis.

Reliability

Case Processing Summary

		N	%
Cases	Valid	80	100.0
	Excluded[a]	0	0.0
	Total	80	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
0.989	20

Table 22- Reliability

4.3. DISCUSSION

After the evaluation of the survey and its artifacts, a careful analysis of the given feedback is made in this section. This discussion has its focus on the artifacts' utility, possible improvements, and general observations of the participants during the survey.

Regarding the utility of the artifact, all participants agreed on the usefulness of guidelines proposed by this research for the people that are getting more rigorous about technology. The need for democratizing IoT among the public seemed to be a shared concern among all specialists and non-specialists. Simplifying consumers lives and reducing their effort on reaching their objectives were the most mentioned benefits.

However, there were some challenges to implement AI associate process where users are older one. Complex processes are difficult to understand makes it impossible for the company to optimize its process problem.

4.4. GUIDELINES

To propose guidelines, conditions are met to help business transforming their traditional Business process to automate and efficient one. These guidelines will improve quality, minimize the time and give benefits in other areas.

Management of business processes (BPM) has seen numerous technical advances. Perhaps the most significant one would be the introduction and further usage of artificial intelligence (AI) as a driving factor for automating processes. The integration of machine learning models (AI) with BPM systems will always allow for the automation of business processes. For example, data may be gathered by constantly repeating the same job and in turn can be utilized to dynamically update automation models. Over time, the AI employed may adapt to enhance the quality of its job.

Another approach to use AI is to take and reuse machine learning models for processes with comparable data sets. These learning models may be modelled and utilized in a new customer model that can minimize additional time and data to develop and carry out a new model.

If activities can be automated using AI, other important tasks requiring staff resources may receive the focus required to perform more strategic company responsibilities. Cost savings may be achieved by using automation

With automation liberating people's resources, new possibilities exist to re-allocate these resources to company tasks that were not feasible in the past. This may lead to new innovations and initiatives which have never been carried out in the past because of price and time. If the new projects can use some automation through AI, the costs will be reduced and implemented.

In fact, creative innovators would be able to participate in additional possibilities via the usage of AI. When determining how AI should be utilized in a company, the managers and IT professionals should pick worthwhile initiatives that are avoided due to far too repetitious expenses and duties.

Quality assurance, production and customer service may be automated using AI. Video processing may also be utilized in the job interviewing process to scientifically detect the intangibilities of an applicant. Certain facial expressions and actions in sales, customer service and other interaction activities are consistently effective. The use of AI may help detect these particular patterns. These technologies need to be created and implemented by humans. In a recent study, CapGemeni concluded that AI would generate more employment than will be lost, comparable to the manner in which the value of technical advances exceeded what it removed.

The use of AI as an automated fundamental job inside the company may lead to lower cost, better customer service and even better project execution. For instance, although an autonomous 18wheel cargo truck is financially beneficial by saving salaried driving money, it is much more important to know that the autonomous truck can work 24/7 without the need to eat, sleep or relax. The rationale is that shipping time is reduced in an extremely important portion of a company. This kind of automation may even contribute to the shelf life of perishable goods, which eventually leads to lower food waste.

The AI is not distant from being created or unattainable, like science fiction, but is accessible to us now, and essential for any future organization's survival, regardless of the industry.

From the analysis it was observed from sample data of about 80 respondents. In this it was observed about - "What general trends in technology have had the most impact on the way you do business process work" 5(6.25%) respondents responded Cloud computing, 24(30%) respondents responded Mobile technologies, 20(25%) respondents responded Digital transformation and 6(7.5%) respondents responded Artificial intelligence or cognitive transformation and 4(5%) respondents responded Embedded collaboration capabilities and 12(15%) respondents responded Embedded process analytic capabilities and 9(11.25%) respondents responded Industry 4.0/Internet of Things.

While AI processes unstructured input, such as pictures and sounds, it structures the data that it generates and needs more structured data to provide a solution. For example, if you have an automated shop greeter, the client may walk in, hold an image of an item they may look for and provide information via the greeter. The automated greeting may contain the aisle position, whether it is stocked or not, or any other essential information. Training allowed by AI will help in identifying a picture of the interaction but has to be included into the product catalogue information, inventories and other information in order to provide the information the consumer needs.

A modest research and development project is an easy approach to get the automation process started. Start with a few precise ideas, but those who build the technology may profit from the opportunity to explore solutions more openly throughout the early phases of the process. When

several prototypes are produced, they may be examined and perhaps one can then be pushed into the implementation phase. This approach may be continued until success is achieved by the R&D team before going on with other comparable initiatives.

First of all, a company must determine where its AI activities are to be performed, whether their public cloud or private cloud. This choice may be guided by the facts collected. When training AI networks large data sets are gained, which implies that companies need to utilize AI where their data is located.

It would make sense for AI to also run on prem data if on-prem data were to be integrated to other on-prem structured data, much as if the data sets are provided from the public cloud via any web services or a natural place for your IoT sets, then it would make sense for your AI data to also run there.

Each single industry, although in various ways and on different times, will be transformed by AI. Process Maker makes it simple for business users to work with IT to automate complicated business processes that link people with current systems.

Understanding intelligent technologies in the context of BPM and envisioning and discussing the challenges and opportunities of moving from current, largely programmatic approaches for BPM, to emerging forms of AI- enabled BPM

The mix of BPM and intelligent technologies has been driven by two factors: the emergence of BPMS as a general platform for the application development, which allows easy integration of other technologies and the need to automate business processes and decisions, ranging from efficiency to compliance. Typical smart technologies complementing BPM include:

- Automated decision-making and business rules enforce rules and best practices. This may guarantee that a knowledge worker does not break the standard process for a particular job and that each instance uses the same decision logic.
- Predictive analytics suggest actions to employees based on comparable historical and present circumstances. This lowers employees' learning time and enables them to make better choices.
- Machine Language (ML) and automation of robotic processes (RPA) automate semi-skilled tasks by learning from human actions, to identify which activities are needed to accomplish a job. This discharges semi-trained jobs from knowledge workers to concentrate on complicated unstructured labor.

- The Internet of Things (IoT) event management interacts with external devices and activities. This enables processes and activities based on remote devices or external data events to automatically be triggered.
- Complex event / stream processing monitors for transaction trends and may trigger new processes or anomaly warnings.
- Process mining identifies emerging process models and behavior and may suggest actions and forecast the conclusion of the process.

All these technologies are not classed as AIs but in many other technologies, AI and ML are becoming building blocks and blurring the boundary between what precisely is and what isn't AIs. For instance, RPA may be implemented using basic training methods to record and play user activities; its actual potential arises when an RPA learning agent is used in advance for a certain amount of time to look at the worker's actions and find the best way to replace them entirely on its own.

From the sample data of about 80 respondents, it was observed about - "Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currently" 29(36.25%) respondents responded as Yes, more than one, and 35(43.75%) respondents responded as Yes, we are engaged in one major transformation project, whereas 16(20%) respondents responded as No.

Strategy for AI in BPM

We asked question “Do you believe there are strategies for AI in BPM systems” To know the view of people if they believe strategy are already out there or no, to have AI in BPM. Maximum people 32(40%) respondents say Agree, 20(25%) respondents responded Neutral, and 14(17.5%) respondents responded Disagree and 7(8.75%) respondents responded Strongly Disagree.

There is more strategy that can be used. The processing of events is another technique that has its origins in the administration of more conventional decisions but integrating AI/ML may identify patterns across thousands of transactions that cannot be easily codified in advance. For instance, this may be used to identify fraudulent financial transaction activities, network security infringements based on access techniques and machine log defects. Another example is process mining. This may utilize conventional process discovery techniques to demonstrate the routes a process instance takes, but when coupled with AI, it gets a lot more capability. These algorithms can anticipate a process instance's completion by providing objectives in the form of process measurements and enable AI to seek the optimal path forward. They can also select which route to use to enhance process metrics

and suggest methods to improve the underlying process for further work. This final skill, which is that AI 'tunes' a process model to achieve optimum performance, closes the process optimization loop and enables self-healing processes.

Guidelines for the use of AI in BPM that could be used in any particular organization to make its processes smarter

Naturally, these technologies are not mutually exclusive: several are usually integrated into a single system to produce smarter operations.

From the analysis it was observed that - "***If you're using software tools to model your process change efforts, in which of the following areas are they most helpful***" 29(36.25%) respondents responded Easing business complexity, 8(10%) respondents responded Enhancing collaboration, 14(17.5%) respondents responded Improving internal and external process interactions and 13(16.25%) respondents responded Process execution and 16(20%) respondents responded Process optimization.

From the analysis of this question- ***In general, would you say that AI(Artificial Inteligence) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction***

29(36.25%) respondents responded Easing business complexity, 8(10%) respondents responded Enhancing collaboration, 14(17.5%) respondents responded Improving internal and external process interactions and 13(16.25%) respondents responded Process execution and 16(20%) respondents responded Process optimization.

All of these enhance customer satisfaction and may also improve job satisfaction by automating unskilled and semi-trained labor which is an overhead of value for the majority of the workforce.

Tools best suited for the use of AI in BPM

In addition to these basic operational advantages, better BPM with AI/ML enables companies to accomplish things that were previously not feasible. For example, it is not only feasible to forecast which process instances are likely to miss their service level contracts or regulatory goals, it is also possible to suggest or automate remedial measures to fulfil deadlines. Such measures may include bypassing authorisation procedures in low-risk situations, altering work queue priority, or assigning work to outside contractors.

From the analysis it was observed that from the sample data of about 80 respondents. In this it was observed about - "***Which are best AI based tools seems more appropriate for your organization***"

24(30%) respondents responded Google AI Platform, 30(37.5%) respondents responded Microsoft Azure and 13(16.25%) respondents responded Wipro HOLMES whereas 13(16.25%) respondents responded Infosys NIA.

5. CONCLUSIONS

This chapter concludes the developed work of this dissertation by reflecting the most important conclusions, limitations, and future work. It also allows a global understanding of whether the specified objectives were achieved or not. Therefore, and considering the collected feedback at the evaluation stage, we can acknowledge the initial objectives were fulfilled, and the proposed guidelines can ensure common citizens' awareness and autonomy during their development of business.

All companies are searching for new methods to improve their power to not only be relevant but also to acquire competitive advantage in the commercial field to grow. Currently, over 37% of businesses are involved and many more intend to use the BPM systems in their operations. BPM systems are focused on providing customers with ultimate experiences by giving cost reduction and process efficiency more priority. The AI-driven technologies influence and change the way companies operate. Cerebral systems of AI offer active and extrapolative analysis. This offers increased efficiency, effectiveness and insights into company processes for better decision-making.

1. Business efficiency acceleration

Today, technological progress is developing more urban business apps based on processes. Recent advances in AI provide companies with methods to foresee the future and prepare ahead. Consequently, it has become simpler to match the limits with the resources available, which will certainly prevent bottlenecks in the future. This reduces the impact of stopped business processes and delays.

2. BPM Systems Integration of AI

An independent study has shown that the Text Analytics/Natural Language Process is a kind of AI, a key crossroads between AI and BPM. In addition, machine learning is another confluence of AI that impacts BPM. This intersection enables the AI engines to measure the skills of automated business operations and provide references. Based on these references, companies may change their business processes and adaptability, which will increase the efficiency of the process.

3. Current business processes impact

The AI-based BPM systems provide better exposure to process flow patterns and forecasts of business metrics. This also helps to provide corrective measures for seamless company administration and revolutionizes today's corporate procedures.

5. Prediction Data

The progress in AI leads to the development of advanced machine learning algorithms. These algorithms assist businesses, and their workers handle the input data complexity that influence the anticipated result. Machine learning BPMs easily identify setups that the company people do not notice readily. With this capacity to effectively identify settings, BPM processes are possible to minimize a simple fraud by credit cards or segment data for accurate services such as marketing prospects. This enables corporate organizations to stand up to shifting market inputs and manage resources.

6. From the prediction to the making of decisions

AI creates methods to apply decision theory simpler and evaluates uncertain and complicated circumstances appropriately. It goes beyond the boundaries of the BPM procedures. AI-based decision-making models are responsible and provide company operations with stability. These models assist forecast the evolving market situation and provide customers suggestions for buying or selling goods, inventories, etc. Therefore, these forecasts may lead to smarter marketing choices. AI-based BPM processes assist to identify and match their services and products with their individual requirements in a changing way. It offers businesses modelling and simulation processes that give consistent and reliable insight into consumer behavior and improved decision-making. In future evaluations, short and long-term marketing tactics may also be revolutionized.

7. From the formulating of decisions to action

The increased impact of AI has allowed different BPM suppliers to develop distinct search algorithms to monitor the complexity of the industry and the technology for optimization. These methods provide vendors a discrete model characterized by a number of states and measures. By using the specified state and action, companies may define search space without any hitch. Advances in the AI have resulted in state-based search algorithms being developed. States thus become the knobs of the underlying graphs, and actions arise from potential transitions between the edges of the graph state. These models may be used in many dominating different modelling methods to best minimize planning, planning and other issues found in the BPM.

AI-embedded BPM solutions provide companies the opportunity to distinguish themselves from the competition. This leads companies to exceed conventional performance blocks so that they may achieve high levels of efficiency and quality in the near future. In addition, AI is not seen as the goal but rather as a tool for efficiency and efficiency. Different companies – big and small – realize the importance of AI-based BPM software and aim to make their businesses optimize and stable.

5.1. Synthesis of Developed Work

By conducting this investigation, the overview of different subjects in AI and business process and gathering knowledge on different technologies made possible to propose a set of guidelines, strategies and challenges that help people businesses.

5.2. Limitations

This investigation had some limitations regarding the validation of the guidelines and recommendations. Even though it was approved by a technical and non-technical audience, the number of participants could have been higher and, consequently, provide a more credible, and universal, validation. Given the pandemics' context that was active during the conduct of this investigation, the availability of several participants was reduced.

This study is limited to 80 respondents of selected companies. To elaborate the problem further number of respondents may be increased and number of companies may be increased.

Additionally, due to the shortage of time and COVID situation, the communication stage previously scheduled in the selected methodology of this study was not fulfilled. The practical application would also test more scenarios and, possibly, collect more insights to widen the research's scope.

1. Management weakness and loss of money

The advantages of the BPM framework will only be fully appreciated if it is properly applied. Failure to respect the methods will lead to severe losses of resources and resources and that is not what you desire. BPM is inexpensive, but not cheap. You still have a lot of money to spend. If you do, you will receive this money back in no time, or you will notice an increase in ROI. If not, your company will have significant issues. Bad dissemination of information may also lead to poor analysis.

2. Innovations limited

As already stated, current technology and employees should be fully used when it comes to BPM. However, it is said that BPM employers are not very well adapted to current technologies or new trends. Process management itself is claimed to impede creativity.

3. Missing communication

Communication is the key to almost everything. Some companies are concerned that the technique used by BPM to aggregate workflows and processes may lead to poor communication between workers involved in various areas of work.

4. In short,

Despite BPM's limitations, it is nevertheless used by many enterprises, corporations and organizations. On the other hand, while it has benefits, some still do not believe in its effectiveness. This is because BPM may lead to a loss of income, clients, sales, or intellectual property if managed incorrectly.

5.3. FUTURE WORK

First, replication research with various panels is recommended. This includes studies that discontinue established BPM principles as well as studies that examine the impact on capacity areas of technologies. The results of these research should ultimately be integrated by means of a meta-analysis to achieve agreement at community level. We suggest that confirmatory techniques be used to evaluate which areas of capacity influence business performance in various settings. In this sense, human capabilities may serve as independent variables, buildings like BPM, processes and business performance as mediation variables (de Bruin and Rosemann 2005), and contextual elements like those included in the BPM context as moderators (vom Brocke et al. 2016). The up-to-date BPM capacity framework and confirmatory research findings assist to discover optimal, typical BPM capacity combinations for various organizational settings. Thirdly, significant research is needed to deal with improved and new capabilities

This involves development of evaluation criteria and techniques and the compilation of best practices. These revised BPM maturity models will enable practitioners to carry out fit/lück analyzes, create roadmaps for capacity development and prioritize investment to deliberately promote business success with BPM in view of digitalization.

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APPENDIXES

APPENDIX 1: QUESTIONNAIRE

1. **Where is your organization located?**

- EU
- UK
- USA
- ASIA
- Other

2. **Which of the following best describes your job function?**

- Executive (CEO,COO,CFO)
- Process practitioner/ Lean/Six Sigma Business Analyst
- IT Manager
- AI Engineer
- BPM Student
- BPM Consultant
- Vendor Representative

3. **Which of the following best describes your organization's size?**

- Large (2000 or more employees)
- Medium (500 to 1999 employees)
- Small (under 500 employees)

4. **Which of the following best describes your industry?**

- Manufacturing
- IT (software/ Hardware)
- Healthcare
- Entertainment
- Telecom
- Banking
- Professional/Business Services/Consulting
- Sales & Marketing (Digital and Manual)

5. **What are the major business drivers causing your organization to focus on business process change?**

- Need to save money by reducing costs and/or improving productivity
- Need to improve existing products, create new products or enter new lines of business to remain competitive
- To automate business complex processes by developing a dynamic technology environment
- Need to improve customer satisfaction to remain competitive
- To improve work efficiency and quality
- Any Other

6. **Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currently undertaking any Transformation Projects related to AI in BPM ?**

- Yes, more than one
- Yes, we are engaged in one major transformation project
- no

7. **Do you believe there are strategies for AI in BPM systems?**
    - Strongly Agree
    - Agree
    - Neutral
    - Disagree
    - Strongly Disagree

8. **How would you describe the overall focus of your organization at this time**

- Focused on improving specific departmental level processes
- Focused on automating departmental or enterprise wide processes
- Focused on incrementally improving existing processes
- Focused on redesigning enterprise wide processes
- Focused on defining an enterprise wide process architecture/ measurement system
- Focused on defining an enterprise wide process management/ governance system

9. **What general trends in technology have had the most impact on the way you do business process work?**

- Cloud computing
- Mobile technologies

- Digital transformation
- Artificial intelligence or cognitive transformation
- Embedded collaboration capabilities
- Embedded process analytic capabilities
- Industry 4.0/Internet of Things

10. Do you think AI is revolutionizing the business process?

- yes
- no

11. In general, would you say that AI(Artificial Inteligence) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction

- Strongly agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

12. What business process initiatives related to AI are underway in your organization this year?

- Development of an Enterprise Process Architecture
- Development of an Enterprise Process Performance Measurement System
- Coordinating Enterprise Process Change efforts
- Digital transformation
- None

13. Do you think using AI is trustworthy and secure for Business process change?

- Yes
- No
- Not sure

14. What obstacle or challenge do you think you may face as you try to gain acceptance of AI in your organization

- Senior management isn't interested or is focused elsewhere
- Management wants ROI estimates that we cannot produce
- We have multiple process change efforts competing for attention
- We have had process projects that failed and management is cautious

- Management does not want to make the investment at this time

15. How has your organization's level of interest in the use of AI in BPM practices changed over the past two years

- Grown rapidly
- Grown modestly
- Unchanged
- Declined modestly
- Declined rapidly

16. Are you currently using any software tools to model the processes you are trying to transform or automate?

- yes
- no

17. If you're using software tools to model your process change efforts, in which of the following areas are they most helpful

- Easing business complexity
- Enhancing collaboration
- Improving internal and external process interactions
- Process execution
- Process optimization

18. If you're using software tools to model your process change efforts, how satisfied are you with your tools' administration, user management, and security capabilities?

- Very satisfied
- Satisfied
- Neutral
- Unsatisfied
- Very unsatisfied

19. Which are main areas, where the software should be more effective

- Redundant task automation
- Predictive analysis

- Cost effective
- Security
- Decision making
- All of above

Which are best AI based tools seems more appropriate for your organization

- Google AI Platform
- Microsoft Azure
- Wipro HOLMES
- Infosys NIA

ANNEXES

ANNEX 1: STATISTICS

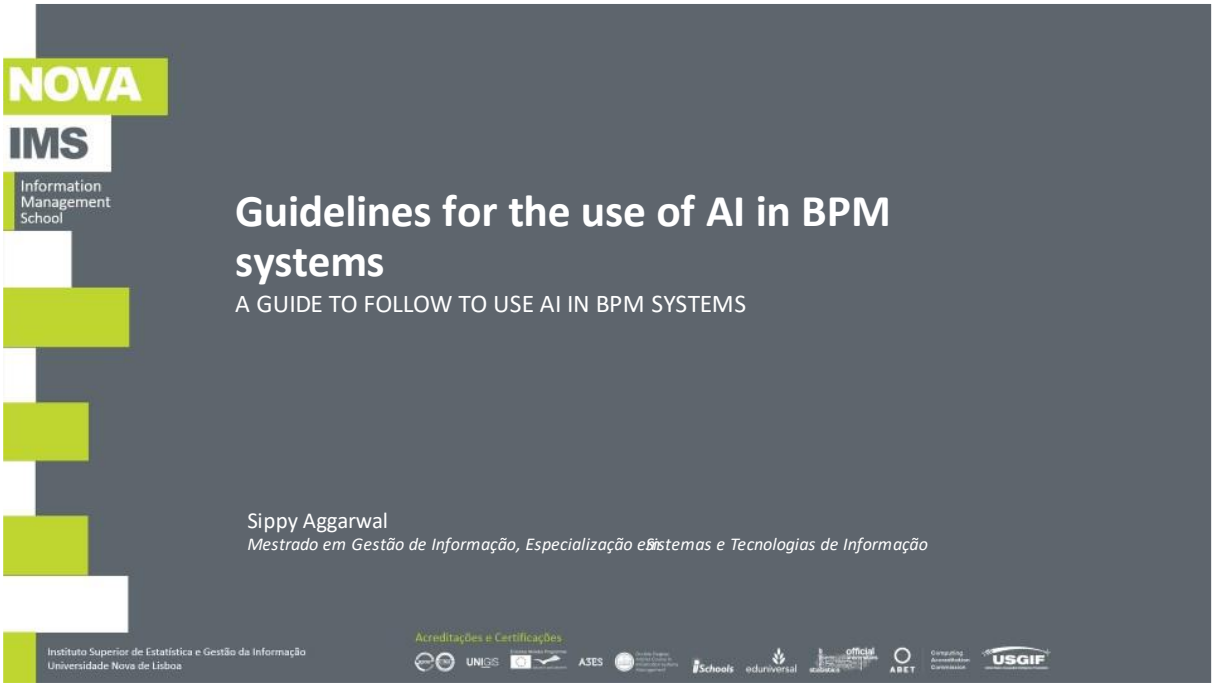
		Where is your organization located	Which of the following best describes your job function	Which of the following best describes your organization's size	Which of the following best describes your industry	What are the major business drivers causing your organization to focus on business process change	Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currently	Do you believe there are strategies for AI in BPM systems	How would you describe the overall focus of your organization at this time
N	Valid	80	80	80	80	80	80	80	80
	Missing	0	0	0	0	0	0	0	0
Mean		2.7000	4.0500	2.1000	4.9750	2.9875	1.8375	2.7750	3.0500
Median		3.0000	4.0000	2.0000	5.0000	3.0000	2.0000	3.0000	3.0000
Std. Deviation		1.42669	1.76391	0.80505	2.04985	1.70252	0.73680	1.11350	1.43112

		What general trends in technology have had the most impact on the way you do business process work	Do you think AI is revolutionizing the business process	In general, would you say that AI(Artificial Inteligence) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction	What business process initiatives related to AI are underway in your organization this year	Do you think using AI is trustworthy and secure for Business process change	What obstacle or challenge do you think you may face as you try to gain acceptance of AI in your organization	How has your organization's level of interest in the use of AI in BPM practices changed over the past two years	Are you currently using any software tools to model the processes you are trying to transform or automate
N	Valid	80	80	80	80	80	80	80	80
	Missing	0	0	0	0	0	0	0	0
Mean		3.6500	1.3875	2.3250	3.0625	1.6500	3.1625	2.8250	1.3875
Median		3.0000	1.0000	2.0000	3.0000	2.0000	3.0000	3.0000	1.0000

Std. Deviation	1.89670	0.49025	1.31952	1.32497	0.71334	1.40923	1.37588	0.49025

		If you're using software tools to model your process change efforts, in which of the following areas are they most helpful	If you're using software tools to model your process change efforts, how satisfied are you with your tools' administration, user management, and security capabilities	Which are main areas, where the software should be more effective	Which are best AI based tools seems more appropriate for your organization
N	Valid	80	80	80	80
	Missing	0	0	0	0
Mean		2.7375	2.8125	3.8750	2.1875
Median		3.0000	3.0000	4.0000	2.0000
Std. Deviation		1.57306	1.20225	1.51261	1.04450

ANNEX 2: PRESENTATION



Session

Introduction	Background and problem identification, Objectives, Struture
Literature Review	BPM and AI Interactions: Digital Transformation, Cognitive BPM, Transformation of RPA into IPA
Research Methodology	Research Methodology
Research Analysis	Survey Design Survey Execution Discussion Guidelines
Conclusion	Synthesis of Developed work Limitations Future work

1 Introduction

Background and Problem Identification: 1 of 2

- **AI has produced a number of various search algorithms, integrated in today's sophisticated optimizing approaches and issue solutions**
- **AI (Artificial Intelligence) technology** is a Business Process Management (BPM) partner as mechanism consist of:
  - Siri and Alexa, and facially recognized gadgets;
  - Intelligent Business Process Management (iBPM);
- **The semi-trained activities through machine learning (ML) and robotic process automation (RPA) automates**
  - Human activities;
  - Unstructured work;
  - initiate processes/activities automatically, based on remote or external events
- **Emergence of a New Research Field' business processs reengineering (BPR)**
  - *Enhanced potential volume, dispersion, persistence and observability, anonymity and deception, salience of valence, community engagement.*

Background and Problem Identification: 2 of 2

- **If a search space exists, the algorithm finds a solution and returns an optimal solution based on certain optimizations functions.**
  - Address challenge when expressing attributes for certain data sets to achieve the desired output
  - Product recommendation
  - Search algorithms correspondingly
- **BPM research in the light of environmental and technical developments.**
  - Across geographical regions
  - Need to reproduce existing experiments
  - New technologies
- **BPM systems must raise level of automation.**

Objectives

Main Objective

To propose the guidelines for the use of AI in BPM system

Specific Objectives

- Understanding, envisioning and discussing the challenges and opportunities of moving from current, largely programmatic approaches for BPM, to emerging forms of AI- enabled BPM
- To propose a strategy for AI in BPM
- To propose guidelines for the use of AI in BPM that could be used in any organization to make its processes smarter
- To identify which tools are best in approach of the use of AI in BPM

2 Literature Review

BPM and AI interaction- Digital Transformation

(Paschek, Luminosu, & Draghici, 2017) *studied "Automated business process management – in times of digital transformation using machine learning or artificial intelligence"*

4.0 phase of the industrial revolution- **Digitization**

- Real and virtual worlds, driven by the Internet, are increasing continuously
- Smart Factory, Internet of Things (IOT), Intelligent Fabrications, Cloud, Big Data
- The conventional business model of the production sector is changing, new models are developing, and incumbents must notice these new competitive challenges quickly and respond to them.

The internet of stuff builds on this concept using the cloud for storage and automating processes in devices that are synced to the internet, such Internet cars and remote lighting systems and shading systems," **says Brixel**

BPM and AI interaction- Cognitive BPM

(*Osuszek, Stanek, & Zbigniew Twardowski, 2018)* *studied "AI for augment human judgement in Business Processes Management"*

The term "artificial intelligence" is colloquially used when computer imitates "cognitive" capabilities associated with human beings

(*Dwarkanhalli, 2018)* *studied "How Cognitive Computing Unlocks Business Process Management's Performance-Enhancing Virtues"*

- A methodology for achieving cognitive BPM is described in this White Paper
- Cognitive computing systems are not explicitly designed, but are trained as human beings

The internet of stuff builds on this concept using the cloud for storage and automating processes in devices that are synced to the internet, such Internet cars and remote lighting systems and shading systems," **says Brixel**

BPM and AI interactions- Transformation from RPA into IPA

(Madakam, 2019) *studied "The Future Digital Work Force: Robotic Process Automation (Rpa)" and the fresh wave of future technology was found by Robotic Process Automation (RPA)"*

- Most advanced technology
- The study finally found that robots and robot process automation technologies are increasingly obligatory in order to perform commercial activities throughout the world. Automation can immediately bring value to core business processes such as the salary of employees, change in employees' status, recruitment and boarding, accounts receivable and payable, processing of invoices, stock management, creation of reports, software installations, data migration and sales on boarding, etc. to name a number of applications
- Robotic Process Automation has a large range of applications, such as health, pharmaceuticals, financial services, outsourcing, retail, telecommunications, energy, utilities, immovables, the FMCG, and much more.

*(**Chakraborti et al., 2020)** studied "From Robotic Process Automation to Intelligent Process Automation: Emerging Trends"*

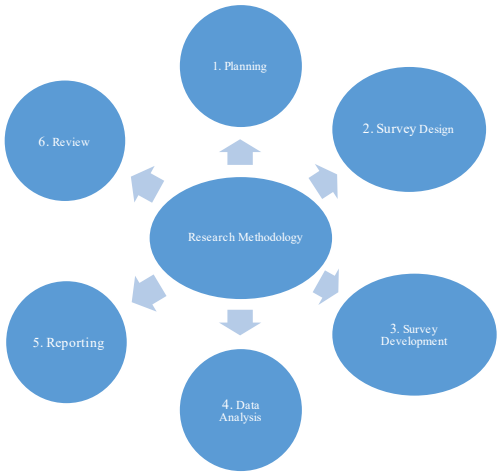
The automation of business steps - known as Robotic Process Automation (RPA) –

- A new kind of tools, known as intelligent process automation, has recently emerged through the intersection of AI, automation and customer data (IPA)
- Undergoes a drastic transition with recent developments in machine learning and artificial intelligence (AI). "Transformation of RPA into IPA: Smart Automation Process":

3 Research Methodology

Research Methodology

- Answering research questions and achieving research objetives
- Results are:
  - Descriptive
  - Quantitative
- Survey has been executed
  - Questionnaire: A set of questions
  - Through sending emails, telephone
  - Responses
- SPSS Analysis
  - Frequency
  - Percentage
  - Mean
  - Standard deviation



4

Research Analysis

Research Analysis- Survey Design

1. A questionnaire survey has been designed by creating a set of questions to collect required information.
2. It includes distinguish by:
   - *Time period*
   - *Respondent Group*
   - *Variable Choice*
   - *Data Collection*

Steps involved:

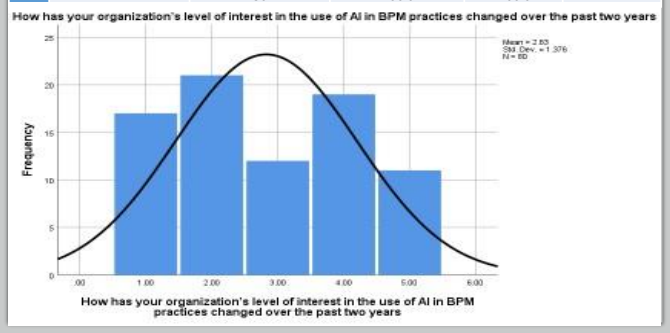
1. Understandingof the problem
2. Designing the questionnaire depending upon the problem and variables
3. Determining the target audiences or respondents
4. Sending the designed questionnaire to the target audience via various methods like email, google forms, WhatsApp etc. And collecttheir responses.
5. Analyzingthe collecteddata to get the desired results
6. Depending upon the results we can produce some suggestions.

Research Analysis Survey Execution

Question: How has your organization's level of interest in the use of AI in BPM practices changed over the past two years

21(26.3%) respondents only responded Grown modestly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grown rapidly	17	21.3	21.3	21.3
	Grown modestly	21	26.3	26.3	47.5
	Unchanged	12	15.0	15.0	62.5
	Declined modestly	19	23.8	23.8	86.3
	Declined rapidly	11	13.8	13.8	100.0
	Total	80	100.0	100.0	



Research Analysis Survey Execution

N- no of responds
Mean
Median
Standard deviation

		Where is your organization located	Which of the following best describes your job function	Which of the following best describes your organization's size	Which of the following best describes your industry	What are the major business drivers causing your organization to focus on business process change	Distinguishing between (1) Transformation Projects, which introduce major changes in the way the organization does business, and (2) Process Improvement Projects, which focus on incremental improvements in existing processes, is your organization currently	Do you believe there are strategies for AI in BPM systems	How would you describe the overall focus of your organization at this time
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	Missing	0	0	0	0	0	0	0	0
Mean		2.7000	4.0500	2.1000	4.9750	2.9875	1.8375	2.7750	3.0500
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Std. Deviation		1.42669	1.76391	0.80505	2.04985	1.70252	0.73680	1.11350	1.43112

		What general trends in technology have had the most impact on the way you do business process work	Do you think AI is revolutionizing the business process	In general, would you say that AI(Artificial Intelligence,) practices and technologies will help to improve your organization's efficiency, versatility and customer satisfaction	What business process initiatives related to AI are underway in your organization this year	Do you think using AI is trustworthy and secure for Business process change	What obstacle or challenge do you think you may face as you try to gain acceptance of AI in your organization	How has your organization's level of interest in the use of AI in BPM practices changed over the past two years	Are you currently using any software tools to model the processes you are trying to transform or automate
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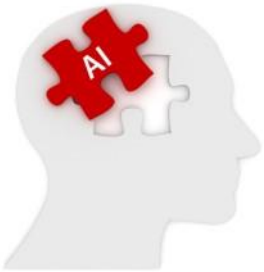
	Missing	0	0	0	0	0	0	0	0
Mean		3.6500	1.3875	2.3250	3.0625	1.6500	3.1625	2.8250	1.3875
Median		3.0000	1.0000	2.0000	3.0000	2.0000	3.0000	3.0000	1.0000

Research Analysis- Discussion

- **Artifacts' utility**
  - All participants agreed on the usefulness of these guidelines
  - Easiness, effectiveness while making AI enabled BPM
- **Need for democratizing IoT**
- **General observations of the participants during the survey**
  - General lack of understanding on AI , ML, algorithm in older age
  - Complex process understanding
- **Some processes are difficult to understand makes it impossible for the company to optimize its process problem**



Research Analysis- Guidelines 1 of 2

Understanding intelligent technologies in the context of BPM and envisioning and discussing the challenges and opportunities of moving from current, largely programmatic approaches for BPM, to emerging forms of AI- enabled BPM

- AI enabled BPM guaranteed that a knowledge worker does not break the standard process for a particular job and that each instance uses the same decision logic
- Make better choices: Predictive analytics
- AI enable BPM enables processes and activities based on remote devices or external data events to automatically be triggered.
- Complex event/ stream processing monitors for transaction trends and may trigger new processes or anomaly warnings.
- AI-based decision-making models can also help managers decide in a business process

Strategy for AI in BPM

- Process mining: conventional process discovery techniques to demonstrate the routes a process instance takes, but when coupled with AI, it gets a lot more capability
- Integrating AI/ML: may identify patterns across thousands of transactions that cannot be easily codified in advance
- AI 'tunes' a process model to achieve optimum performance, closes the process optimisation loop and enables self-healing processes

Research Analysis- Guidelines 2 of 2

Guidelines for the use of AI in BPM that could be used in any organization to make its processes smarter

- Start with a few precise ideas.
- Automated decision-making and business rules enforce rules and best practises
- If you're using software tools to model your process change efforts, most helpful area is easing business complexity
- Predictive analytics suggest actions to employees based on comparable historical and present circumstances. This lowers employees' learning time and enables them to make better choices.
- The Internet of Things (IoT) event management interacts with external devices and activities
- ProcessMaker makes it simple for business users to work with IT to automate complicated business processes that link people with current systems
- Producing several prototype approach may be continued until success is achieved by the R&D team before going on with other comparable initiatives.
- Forecast the conclusion of the process

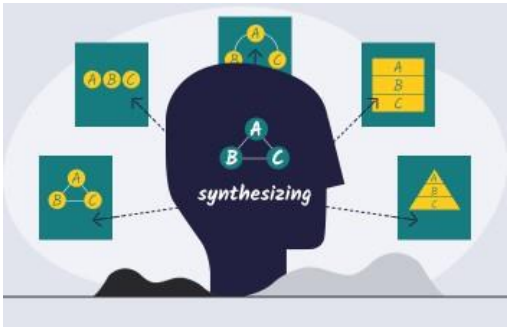
To identify which tools are best in approach of the use of AI in BPM

- 30(37.5%) respondents responded Microsoft Azure
- 24(30%) respondents responded Google AI Platform

5 Conclusion

Conclusion- Synthesis of Developed work

- By conducting this investigation, the overview of different subjects in AI and business process and gathering knowledge on different technologies made possible to propose a set of guidelines, strategies and challenges that help people businesses.
- These guidelines were validated by technical and non-technical specialists and business owners.



Conclusion- Limitations

This investigation had some limitations regarding the validation of the proposed guidelines

- The pandemics' context that was active during the conduct of this investigation, the availability of several participants was reduced
- Limited to 80 respondents of selected companies
- Only Guidelines, not framework
- Management weakness and loss of money
- Innovations limited
- Missing communication

Conclusion- Future Work

- Propose a framework by following guidelines
- The up-to-date BPM capacity framework and confirmatory research findings assist to discover optimal , typical BPM capacity combinations for various organizational settings
- Development of evaluation criteria and techniques and the compilation of bestpractices
- Revised BPM maturity models

These revised BPM maturity models will enable practitionersto analyzes, create roadmaps for capacity development and prioritize investment to deliberately promote business success with BPM in view of digitalization.

Thank you!

Acreditações e Certificações

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