

Empowering Organizations through IT and IoT in the Pursuit of Business Process Reengineering: The Scenario from the USA and Bangladesh

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ABSTRACT

The current competitive environment demands that enterprises adopt changes that lead to market share and profitability expansion. One effective method businesses adopt is Business Process Reengineering (BPR). This entails redesigning business processes radically to realize significant progress on performance metrics. Information Technology (IT) is essential in enabling the successful implementation of BPR, although not exclusively singly accountable. It provides vital levers for simplifying tasks, institutional structural modification, work adaptations, and phenomenal achievements. IT remains pivotal alongside other factors that enable successful enterprise-wide change through strategically implemented BPR. Among other things, BTP promotes transformational capability through process optimization, task automation, and overall efficiency increment and catalyzes change within organizations. Utilizing IT in BPR initiatives unlocks fresh possibilities leading to phenomenal benefits such as superior productivity, streamlining of workflows, increased collaboration, and a remarkable improvement in performance. This piece exemplifies the importance of IT as a strategic tool when executing BP. It showcases its potential as a positive outcome driver in the dynamic business landscape.

Key words: Information Technology, Internet of Things, USA, Bangladesh, Business Process Reengineering

INTRODUCTION

In today's competitive business market scenario, companies can only remain agile by continuously adapting operational efficiencies driven by process optimization strategies that enhance existing processes, leading to improved performance metrics (Hammer & Champy, 2009). One such strategy utilized frequently amongst organizations is Business Process Reengineering - A disruptive approach involving the conceptual transformation of business processes towards optimized, efficient workflows, reducing costs yet not compromising quality or customer satisfaction. Key supporting factors are necessary to roll out successful Business Process Reengineering initiatives, with information technology being one of the most crucial. It has evident advantages over other enablers when redefining work methods or automating tasks while streamlining workflows, as Davenport & Short (1990) suggested. Incorporating IT (Information Technology) within organizations' strategic

initiatives translates into improved productivity levels that support teams, thus reducing manual workloads to achieve sustainable growth with streamlined team collaboration and leadership.

Tapscott & Caston (2021) highlight the pivotal role played by IT when optimizing operations to enhance efficiency during transformative changes within organizations. This optimization can be more efficient if BPR can be adopted in its methodologies because the review paper (O'Neill & Sohal, 1999) concluded that this approach would lead organizations to significant performance enhancements while adequately meeting customers' expectations and proactive responses invoking emerging market trends.

In summary, incorporating information technology enables Business Process Re-engineering-associated process optimization favors distinct competitive advantages through essential tools delivering considerable performance gains resulting from an

adequate adjustment to emerging demands while supporting strategic corporate objectives meticulously.

Implementing IT-enabled process revamp considerably affects different areas within an organization. This approach has the potential to simplify redundant tasks automatically within an operation by freeing up resources that could then concentrate on more valuable activities. Consequently, it enables the integration of different technologies by facilitating hassle-free information exchange without any complications while making informed decisions promptly. These data-driven processes affect the business positively by transforming it skillfully through appropriate cloud computing, big data analytics, artificial intelligence & IoT systems.

This transforms routinely static operations into proactive ones in adapting fast services across markets, dynamically meeting evolving customers' changing demands - setting up companies for long-term success.

DEFINING THE CONCEPTS: BPR, IT, AND IOT

Organizations adopt Business Process Reengineering (BPR), a strategic initiative for radically redesigning business processes to achieve significant improvements in performance efficiency and effectiveness stated in Hammer & Champy's book published in 2009. Information Technology's integration into the context of BPR plays a critical role as it provides tools, technologies, and infrastructure to support process optimization and automation, emphasizes the study by Davenport & Short (1990).

With IT applications, organizations can digitize operations, automate manual tasks, and integrate disparate systems for simplicity and improve operational efficiency. In driving BPR, The Internet of Things (IoT) complements IT providing a network of interconnected physical devices embedded with sensors that collect real-time data while exchanging it among themselves, precise research from Gubbi et al. (2013). IoT devices that generate vast amounts of real-time data can be seamlessly integrated into IT systems and analyzed using advanced analytics tools, which enable corporations to gain insights.

Adopting IoT in manufacturing has transformative potential in the manufacturing industry, and it can be accelerated because it has the capabilities to be integrated with big data. Such integrations can assure productivity by reducing costs and adding monitoring, visualization, and control systems. (Illa & Padhi, 2018). Integration of IoT for utilization of big data has been presented in (Illa & Padhi, 2018), and the research concluded that the approached system with IoT in BPR can utilize big data and assure visual-based monitoring. On the other end, supply chain management is poised to benefit if IoT devices are integrated with IT systems providing end-to-end visibility, as noted in the article.

Integrating IT and IoT technologies holds numerous benefits for businesses seeking process optimization; for example, IoT has been integrated with Cloud computing by Stergiou et al. (2018). By utilizing IoT-enabled sensors combined with advanced IT systems, companies are better equipped to monitor inventory levels in real-time, ultimately leading to improved logistics management which can help meet consumer demand more efficiently.

The confluence of technology results in improved customer experiences through enhanced personalization abilities, as Atzori et al. (2010) suggested. By collecting data about customer usage patterns, varied behavior particular preferences accessed via the array of devices - IoT organizations are able to make informed decisions concerning user needs implementation.

For example, integrating intelligent home gadgets or wearables could bolster organizational efforts toward nurturing positive consumer relationships while increasing satisfaction due to convenient service provision. In totality, businesses with a clear strategy for leveraging these technologies gain competitive advantages as they decrease operational costs while execution is optimized via real-time monitoring; thus, enhancing decision-making prowess while catering better services that ensure customer loyalty.

LITERATURE REVIEW

Organizations looking to drive transformative improvements in their processes often adopt business process reengineering (BPR) as an operational strategy. In the digital age, where technological advancements like Information Technology (IT) and the Internet of Things (IoT) have created unique opportunities for augmenting BPR strategy initiatives, effectively integrating both solutions is instrumental in optimizing potential returns on investment.

This literature review paper highlights existing research studies (Gutlapalli et al., 2019; Bodepudi et al., 2021; Mandapuram, 2016) on IT/ IoT technology application-centered BPR projects benefits achieved alongside challenges reported. Digitizing operations facilitates automation of various manual tasks boosting operational efficiency significantly while minimizing errors in process workflows from real-time monitoring provided by embedded IT mechanisms driving data-driven insights rendering better decision-making capabilities pinpointing bottleneck processes yet enabling targeted improvement approaches efficiently (Gutlapalli, 2016).

The cost-effectiveness associated with IoT technology recommends its applicability across several industries that can capture real-time data from physical assets/machines seamlessly integrated into organizational IT systems yielding further possibilities for improving productivity through predictive maintenance

methods minimizing downtime while offering end-to-end visibility-based efficient strategies during supply chain management processes optimization (Gutlapalli, 2017).

Although such integrations offer enormous advantages in improving operational capability, interconnecting both systems raises security concerns due to various vulnerabilities encountered moving forward with any project-like BPR's implementation. Organizations must ensure robust data protection protocols are instituted towards mitigating possible breaches or external threats, guaranteeing successful project outcomes are not jeopardized. Effective implementation of IT and IoT solutions requires a comprehensive understanding of prior organizational contexts. To do this, organizations need proper planning, resource allocation, and mastering effective change management strategies geared toward achieving successful outcomes (Mandapuram, 2016). Interoperability amongst different systems can also be a great point to scale achievable as it enables seamless data exchange and integration.

Additionally, skill gaps and the need for employee training or upskilling must be thoroughly considered before initiating such implementation projects. Different case studies have illustrated the impact these systems have on improving process efficiency, customer satisfaction, and cost savings within various industries. However, organizations migrating to IT and IoT for BPR processes should consider security, risk management, and privacy concerns when engaging in these approaches (Reddy et al., 2020). Research in the future should focus primarily on what is a mix of aspects among developing robust security frameworks, exploring ways of dealing with interoperability challenges, having more significant insights into effective talent management programs, and investigating various models of combining strategic approaches intended to align the operations with stakeholders (Mandapuram, 2017). Additionally, undertaking further case studies and empirical research holds immense potential to provide invaluable insights regarding the distinct benefits, challenges as well as success factors prominent within different industry sectors alongside organizational settings. The study underscores the prominence of IT alongside IoT technology in driving business process reengineering initiatives to fruition by furnishing critical tools comprising requisite technology and the infrastructure necessary for digitization coupled with automation and facilitating data-driven decision-making processes (Bodepudi et al., 2021). With IoT in play, businesses can collect real-time data, leading to streamlined operations and enhanced visibility throughout their organization. Despite existing bottlenecks encountered during adoption processes, successful integration of both IT requires robust collaborations driven by solid leaderships, all culminating towards improved efficiency and saving costs while fostering an unforgettable customer experience vital for

long-term prosperity within such an ever-changing digital landscape (Mandapuram & Hosen, 2018).

EXPLORING IT, IoT FOR BPR

When appropriately implemented throughout an organization's Business Process Reengineering (BPR), the use of Information Technology (IT) or the Internet of Things (IoT) contributes significantly towards a firm's capacity to optimize critical operating procedures from all angles. For any company or corporation looking to gain a competitive advantage by improving its operations' productivity levels throughout different stages, choosing the right tools is crucial to achieving specific goals within a set timeframe. In this context, both IT & IoT play pivotal roles by offering various technological solutions to enable enterprises to gather valuable data about their respective operating systems so that shortcomings are detected promptly. Also, long-term planning becomes less speculative due to IoT device integrations providing real-time analysis focused on quickly uncovering essential performance data. IoT is essential in achieving process optimization goals by empowering companies with the right tools to improve their internal workflows via automation technologies.

Azzahra & Dachyar (2021) implemented IoT using BPR to improve the process of Refrigerator Handling, and the primary purpose was to reduce cargo damage. Another study has applied IoT with BPR in pharmacies to reduce the waiting time and improve pharmacy service by modifying the hospital process (Arovah et al., 2020). Further, IoT integration with BPR has been shown in a case study of seaports (Ferretti & Schiavone, 2016) to explore how IoT and BPR can improve the design of businesses process. However, enterprises must successfully address specific challenges related to integrating IT technologies alongside IoT in BPR initiatives. Privacy remains a significant concern amid rising connectivity between different devices/systems, requiring the adoption of robust security measures that protect sensitive data. Standardization measures should be standardized to overcome interoperability challenges across various IoT devices/platforms (Gubbi et al., 2013).

IT systems provide the much-needed foundation for process digitization. However, IT technologies combined adequately with IoT offer far more significant operational benefits through automation tools, data-driven decision-making capabilities & improved collaboration amongst cross-functional teams within the organization. Achieving successful integration into BPR initiatives requires prioritizing addressing data privacy/security issues alongside ensuring compatibility between different devices/platforms and focusing on the seamlessness of integration and reliable data exchange (Atzori et al., 2010).

BPR IMPLEMENTATION

Business Process Reengineering (BPR) is enhanced by Information Technology (IT) and the Internet of Things (IoT) working in synergy for effective implementation. Here is a concise yet detailed overview of how IT and IoT are implemented in a way that advances BPR efficiency:

Process Mapping and Analysis: To accurately map/analyze business processes. Organizations leverage IT systems alongside IoT devices to collect data on process steps. Timings and resource utilization while real-time data from IoT devices include environmental conditions, machine performance, and inventory levels resulting in easy identification of process bottlenecks/inefficiencies.

Process Design: Integrating information technology (IT) and the Internet of Things (IoT). Organizations have a unique opportunity to optimize their business processes by reducing redundancies in the workflow and improving resource allocation. Through IT systems implementation within these business models, companies can streamline manual tasks and introduce workflow management tools that allow seamless communication across different organizational stages, ensuring maximum efficiency. Additionally, utilizing IoT devices provides businesses with remote monitoring and control of physical processes for automation, allowing for real-time decision-making and thus optimizing overall business output.

Data-Driven Decision-Making: Obtaining real-time or past information may only be feasible with recourse to IT or IoT for many businesses today; hence they have emerged as crucial enablers for driving BPR initiatives through enhanced access to critical organizational data through improved decision-making mechanisms with better analytical capacity. Organizations need not rely on guesswork but leverage analytical tools plus BI systems commonly available today to extract vital cues from pools of intricate yet informative datasets collected from multiple sources aided by IT & IoT provisions at hand within the company premises or all across the globe depending on preset targets set strategically for targeted analytics towards improving processes more effectively.

Enhanced Collaboration & Communication: Seamless expertise sharing /coordination among every stakeholder involved in BPR initiatives is achieved using digitized collaborative platforms fueled by IT system groundings, effectively promoting productive teamwork while guaranteeing smooth information exchange between interconnected IoT systems and facilitating enhanced collaboration.

Performance Measurement/Monitoring: Efficient progress monitoring powered through advanced capabilities delivered via combined applications involving Performance Indicators coupled with expedited IoT-enabled real-time insights establishes meaningful oversight from all stakeholders laser-focused on optimized results throughout the lifecycle of a BPR initiative. IT and IoT are excellent tools for implementing BPR successfully in an organization by providing numerous capabilities that make it all possible. From mapping out processes to analyzing them for redesign opportunities, technology-based resources provide the foundation for enhancing productivity while driving better business results overall.

Continuous Improvement and Innovation: Harnessing technology is critical if businesses want success in BPR through sustaining a culture that fosters continual growth & innovation—this requires using both IT & IoT solutions consistently. Collecting data through these technological tools makes it easy for organizations to analyze their processes' performance efficiently enough to detect areas they need more optimization/improvement measures. Integrated with IoT devices, businesses are going beyond mere optimization into exploring novel ways to derive value-added improvements, such as implementing predictive maintenance strategies and maximizing downtimes reduction while balancing reliability issues- improving overall system capabilities dramatically! With such feedback loops facilitated by improved IT systems capturing employee/customer insights provides valuable feedback-which cultivates perpetual growth & innovative thinking at all levels.

The combination of IT and IoT provides valuable resources for successfully implementing BPR. Process mapping and analysis and process redesign techniques are supported by data-driven decision-making and collaboration across functional areas. By regularly monitoring performance metrics that align with strategic objectives while continuing to pursue continuous improvement efforts, an organization will leverage these technologies to drive meaningful change. The outcomes are notable improvements in efficiency and productivity enhancements that translate into better business results.

SUCCESSFUL BPR IN REAL SCENARIOS

For organizations looking to achieve successful Business Process re-engineering (BPR), IT & IoT tools are fundamental as they offer strategic approaches toward organizational improvements. Gases result from mapping out processes, analyzing them, and redesigning them accordingly toward optimal efficiency & productivity. IT automation comes with task automation along with

streamlining of workflows which optimizes communication channels within an organization while paving the way for more vital employee collaboration throughout departments. Here are a few real-life successful cases of Business Process Reengineering (BPR):

Maersk Line: Maersk Line is recognized as one of the largest shipping conglomerates worldwide. The corporation implemented a comprehensive business process reengineering (BPR) initiative utilizing cutting-edge IT and IoT technologies to optimize its container shipment mechanisms. With the strategic incorporation of IoT sensors within all shipping containers, Maersk Line acquired instant access to data concerning the location of each container, along with other critical metrics like temperature, humidity levels, and container security. Consequently, this insightful data empowered the company to augment supply chain transparency levels, improve the utilization efficiency of containers, and ultimately boost operational efficacy.

General Electric: The incorporation of IT and IoT into GE's manufacturing methods changed when they implemented the BPR methodology. IoT-enabled sensors and advanced analytics tools helped them gather crucial real-time information about their industrial machinery's performance conditions and status. These gathered insights enabled GE to make further improvements towards preventing failure at an earlier stage while optimizing maintenance schedules which significantly cut downtime rate. Ultimately this initiative yielded overall increased productivity rates with considerable cost reductions leaving customers satisfied.

Walmart: To optimize its supply chain objectives, Walmart effectively employed Business Process Reengineering (BPR) by adapting IT and IoT strategies. With the incorporation of Radio Frequency Identification (RFID) technology, Walmart could seamlessly track live inventory movements in its network of warehouses while ensuring that stock availability remained sufficient across various stores and geographic regions. This dynamic visibility proved critical in enhancing inventory management by eliminating out-of-stock scenarios and enhancing order-fulfillment efficiency with precision techniques that extensively addressed customer satisfaction levels. In executing these measures under BPR implementation through IT applications like RFID adoption, among other initiatives, Walmart managed to lower cost incidence coupled with ample profits for an improved economic outlook.

Siemens: Siemens is a prominent multinational conglomerate that employed strategic business process re-engineering (BPR) coupled with advanced

technologies like IT and IoT to enrich their manufacturing processes in impressive ways. They utilized IoT-enabled sensors alongside continuous connectivity for seamless monitoring of machine functions, including energy consumption levels and overall operational efficiency. After scrutinizing this data, they successfully identified critical areas for optimizing processes while simultaneously implementing crucial predictive maintenance strategies, resulting in far-reaching benefits such as higher productivity and equipment reliability.

City of Barcelona: The City of Barcelona implemented BPR with IT and IoT to transform its urban infrastructure and enhance the quality of life for its residents. It has been a boon for Barcelona to power its public utility system with IoT sensors and data analytics. The metropolis revamped resource allocation for critical public necessities like waste management, street lighting, and parking systems. Using live data captured by state-of-the-art IoT devices helped reduce energy consumption while consistently sustaining high-quality service standards for citizens.

Ford Motor Company: During the early years of the nineties, Ford found itself confronted with heightened rivalry from Japanese car manufacturers that demanded quick action on their part in light of this situation. They decided that undertaking Business Process Re-engineering or BPR would be imperative for streamlining their production methodology while controlling overheads. It was due to BPRs successful execution that Ford realized a cost reduction of almost 30%, coupled with an impressive increase in productivity by nearly fifty percent.

T-Mobile: The strategic adoption of BPR helped T-Mobile overcome competition from more prominent players in the wireless market. After struggling for years with long waiting times and poor overall satisfaction rates due to less optimized processes, they initiated significant changes by implementing BPR. As reported later on when reflecting on the results of adopting this business process reengineering approach - wait times were cut by almost half while achieving high marks for customers' satisfaction went up twofold since changes were implemented.

Airbnb: Another outstanding example of successful BPR implementation is demonstrated by Airbnb. A peer-to-peer scheme dedicated to revolutionizing accommodation rentals for all involved parties - including hosts and guests - in the early days, it needed help with its product development process. However, through careful administration of effective BPR strategies, Airbnb effectively eliminated these

hindrances and drastically reduced new product turnaround times by 50%.

IT & IoT are utilized efficiently in BPR to deliver transformative results for businesses that opt for such a strategy. Drawing insights from real-time data via advanced analytics tools enables continuous process optimization while promoting informed decision-making within the organization. Improved operational efficiency is thus realized alongside considerable cost savings and customer assurance due to an increased quality output generated using such technologies.

Successful BPR in Real Scenarios: While Business Process Reengineering (BPR) with Information Technology (IT) and the Internet of Things (IoT) has the potential for significant improvements, some real-world situations have posed challenges or resulted in unsuccessful outcomes for BPR efforts that utilize IT and IoT resources. Several instances highlight these issues:

Hershey's ERP Implementation: Hershey's took on the daunting task of implementing an Enterprise Resource Planning (ERP) System in 1999. Part of its overall Business Process Reengineering (BPR) strategy, it aimed at interlinking core supply chain activities internally & increasing productivity-related efficiencies company-wide. Sadly, numerous obstacles presented themselves throughout this implementation phase leading mainly to disruptions in company operations. Most prominent among these difficulties were production delays and product shortages, stemming from software inadequacies that resulted in the new system's inability to handle peak season demand. This setback taught Hershey first-hand that proper planning, testing, and assessment deliberation of the potential consequences are fundamental when considering system changes on such a significant scale.

Knight Capital Group: Knight Capital Group, an esteemed financial services company, faced an enormous loss of almost \$440 million from their automated trading system within just 45 minutes in 2012. The root cause of this catastrophic occurrence was defective software deployment during their business process reengineering (BPR) initiative. Following the installation of their new algorithm intended for optimizing efficiency during trade operations, it was discovered that some coding errors had triggered unintended trades in large volumes. This experience indicates the significant essence involved in engaging exhaustive testing protocols and competent risk management practices while adopting IT and automation techniques within financial systems.

Los Angeles Unified School District: In partnership with information technology (IT) and the Internet of Things (IoT), The Los Angeles Unified School District (LAUSD) initiated a noteworthy business process reengineering (BPR) project to implement an innovative student information system aimed at simplifying administrative processes while improving communication amongst schools, educators, parents, and students. Despite its promising vision initially envisioned by the district leaders and collaborators involved in the project's implementation plan - technical glitches existed in various forms throughout the roll-out of the new system creating considerable delays within training phases resulting from data inaccuracies amidst frustrated stakeholders attempting to commence operations -the case highlights how vital comprehensive change management practices involving relevant stakeholders' contributions can be essential for successful project implementation when delivering similar initiatives.

UK National Health Service (NHS) IT Project: Intending to enhance efficiency in healthcare, the NHS set out to implement a centralized electronic health record system through a BPR program. The National Program for IT (NPFIT) confronted several hurdles, such as cost overruns, delays, and opposition from health practitioners. Technical difficulties and inadequate stakeholder involvement aggravated this complex project, eventually resulting in its termination in 2011. This occurrence stresses the significance of sensible planning, efficient communication, and comprehensive input from end-users during the design and implementation phases of IT systems for healthcare.

The significance of advanced planning, successful change management, engaging stakeholders, and comprehensive testing cannot be overstated in BPR programs that implement IT and IoT. Assessing potential risks, tackling technical complications, and aligning implemented systems with organizational prerequisites and capacities is critical. Exploring the reasons for these failures can furnish valuable observations to steer clear of comparable mistakes and enhance prospects for successful BPR deployments.

Success factors: Business Process Reengineering (BPR) requires thoughtful planning of multiple factors contributing to its success rate to ensure successful implementation. These critical success factors are:

Leadership and Management: Leadership and managerial support are crucial in driving successful BPR. Not only does this ensure adequate resources, but it also emphasizes top leadership's vision, which is necessary for the process's success. Additionally,

empowering employees through engagement in the reengineering process at all levels is essential.

Effectively defining objectives and scope is critical for aligning team efforts and achieving desired outcomes consistent with organizational strategic objectives. Clear, Specific, Measurable, Achievable, Relevant, and Time-bound goals (SMART) facilitate precisely specifying these objectives.

Process Analysis: A detailed process analysis followed by its efficient redesign from time to time are essential to ascertain BPR's success. Utilizing various tools, such as value stream mapping, during the analysis helps streamline processes effectively while ensuring alignment with the desired outcomes.

Stakeholders' Engagement and Communication: Stakeholders' involvement throughout the BPR process ensures better buy-in and adherence toward achieving desired outcomes. Improved stakeholder communication helps provide a clearer understanding of the intended purpose and benefits of such alterations' impact, thus facilitating feedback collection of necessary adjustments before implementation.

Technology Enablement: Employing suitable technologies like IT and IoT can optimize revamped business processes' efficacy and output. Proper assessment aligning with specific requirements will help select the technology best suited for desired outcomes resulting in enhanced process performance. Organizations must adequately invest in technological infrastructure and set up proper system integration while ensuring adequate training to implement the solution at hand successfully.

Change Management and Training: Business Process Reengineering (BPR) entails substantial operations, positions, and accountabilities modifications. It is vital to adopt change management tactics to deal with pushback, foster approval, and extend education and assistance. Engaging personnel at the outset of the transition to attend to their apprehensions and advance their ability to conform to fresh procedures is paramount.

Performance Measurement and Continuous Improvement: Measuring the efficacy of revamped processes necessitates establishing metrics. It is crucial to pinpoint critical performance indicators (KPIs) for monitoring progress, evaluating results, and driving continuous improvement. Regular analysis of data, feedback loops, and consistent monitoring help identify areas requiring additional optimization while securing continued achievements.

Flexibility and Adaptability: It is crucial to develop metrics for assessing the efficacy of reengineered processes. These should include KPIs, which enable

us to gauge progress, assess results, and cultivate continuous enhancement. Consistent monitoring, data analysis, and feedback mechanisms pinpoint areas needing further streamlining and guarantee ongoing triumph.

Keep in mind that these factors are not all-encompassing in scope. Their importance might vary depending on industry-specific contexts. For successful BPR implementations to occur successfully, one must adopt an inclusive strategy covering organizational aspects, technological requirements, and accounting for people-oriented matters. They must also consider the distinct hurdles or opportunities for the organization at hand.

CHALLENGES OF BUSINESS PROCESS RE-ENGINEERING (BRP)

The implementation of Business Process Reengineering (BPR) in Organizations may encounter various challenges, including:

Resistance to change: One of the primary hurdles related to BPR emanates from employee opposition and stakeholder pushback on proposed changes from higher-ups that could significantly disrupt their work operations or routines. Creating a conducive environment for transformation mandates implementing an empirically tested change management strategy that ensures buy-in across all parties affected by these modifications, continually being transparent about motives - through exhaustive communication channels -and providing sufficient enough training support for efficient adaptation accordingly are recommended ingredients as well to guarantee successful implementation at all times needed.

Lack of top management support: Efficient execution of BPR initiatives necessitates strong leadership and backing from top management. With their dedicated involvement and buy-in, it becomes possible to confront organizational challenges, allocate resources judiciously, and enforce essential transformations across departments.

Complexity and scope: Achieving Business Process Re-engineering (BPR) demands a thorough analysis combined with significant redesign operations to enhance organizational effectiveness. Although essential for success, this endeavor often implicates complexities that make it demanding regarding both time allocation and resources utilized. Critical aspects include determining focal points worthy of attention and identifying critical business operations even as one navigates departmental dependencies within the enterprise infrastructure.

Inadequate planning and execution: Successful BPR projects rely on careful planning and proper

execution; failure in either aspect can lead to unfavorable outcomes. Creating a detailed plan with precise objectives, milestones, and timelines from the beginning of the project's conceptualization phase will improve the chances for success. Inconsistency during implementation could result in ineffective resource utilization or incomplete alterations, which may hinder progress or, even worse, cause market disruption if not managed correctly.

Lack of process understanding and documentation: BPR requires a deep understanding of existing processes, their inefficiencies, and opportunities for improvement. Organizations may sometimes need more process documentation, making it easier to identify bottlenecks and redesign processes effectively.

Technology limitations: Business process reengineering (BPR) frequently involves utilizing technology to strengthen operational enhancements. Nevertheless, businesses could experience obstacles that are interrelated with archaic IT systems, disparities in compatibility, or lack of technological abilities. To surmount these constraints, investing in new technological capabilities or merging prevailing tools may be vital.

Measurement and evaluation: Assessing the success and impact of BPR initiatives can be daunting. In order to gauge their effectiveness, establishments must establish apt metrics and tracking mechanisms. Failure in proper evaluation could lead to difficulty appraising the resulting benefits and making crucial changes.

Lack of continuous improvement mindset: BPR is not a one-time effort but a continuous process improvement journey. Organizations that fail to embrace a culture of continuous improvement may need help to sustain the benefits achieved through BPR. It is crucial to foster a mindset of ongoing evaluation, adaptation, and innovation.

These challenges highlight the importance of careful planning, stakeholder engagement, change management, and ongoing monitoring to address the complexities associated with BPR and maximize its success.

To maximize success in conducting BPR, We must place great importance on careful planning, engaging stakeholders, managing change effectively, and continuously monitoring progress to maximize success in conducting BPR. These challenges demand a high concentration of management and careful handling.

CHALLENGES OF BRP IN IT AND IOT

It is essential to recognize how incorporating Information Technology (IT) and The Internet of Things (IoT) into

Business Process Reengineering (BRP) affects how the process unfolds. Integrating these techs has a considerable impact on ensuring a seamless execution; ignoring this step makes it difficult to get through BRP smoothly: here are several unique challenges that emerge from incorporating IT and IoT into BRP:

Technology integration: Incorporation of Information Technology (IT) and the Internet of Things (IoT) into Business Process Reengineering (BPR) initiatives can enhance organizational efficiency in myriad ways. It also presents additional obstacles that companies must overcome if they want their implementations to succeed. Of these impediments is integrating IT and IoT solutions into pre-existing business processes. Ensuring efficient communication between different components. Both within the system and with external entities such as legacy systems. It can be challenging. If companies cannot resolve integration issues effectively, it may lead to data inconsistencies, operational disruptions, or compatibility complications, putting the entire implementation at risk.

Data security and privacy: With the increased use of IT and IoT devices, organizations must address data security and privacy concerns. Collecting, storing, and analyzing large amounts of data from IoT devices introduces potential risks, such as unauthorized access, data breaches, and privacy violations. Ensuring robust security measures and compliance with data protection regulations is essential.

Data management and analytics: The fast-evolving technological landscape has led to an explosion of data generated by IT and IoT efforts. Efficiently managing this vast array of information requires expertise in capturing it and storing it appropriately while implementing effective processing techniques that allow timely analysis within real-time limits. In light of these challenges organizations face that require swift yet accurate decision-making processes based on observed trends derived from the scrutiny of available datasets, implementing solid fundamental frameworks focused on data governance coupled with optimally designed management systems fortified with sophisticated analytical features has become highly critical.

Scalability and infrastructure requirements: Effective integration of IT and IoT into business processes calls for a scalable infrastructure that can support the increased data volume, processing capabilities, and connectivity demands. It is vital for organizations undertaking such a transformation to appraise their present capacity for accommodating these technological requirements. Investing in upgraded or new infrastructure will likely be imperative for

those serious about implementing successful reengineered processes.

Skill gaps and training: Integrating IT and IoT tools in business processes might necessitate revamping employee skill sets. Enterprises may confront problems surrounding skill shortages and the need for proper coaching and instruction, leading to optimal utilization of these technological advancements. Ensuring adequate preparation and sustenance is imperative for successful incorporation.

Change management: Successfully integrating new technologies into an organization requires careful attention to effective change management practices. This is particularly true regarding BPR initiatives involving IT and IoT – the scope of potential impact is broad. To ensure that implementation goes smoothly, clear communication channels must be in place, all stakeholders must be engaged throughout the process, and potential resistance or concerns must be proactively addressed.

Cost and ROI considerations: Implementing IT and IoT solutions could demand considerable upfront investments. These investments include purchasing technology, upgrading infrastructure, and conducting training programs. To warrant such costs related to adopting IT and IoT in BPR initiatives, organizations must carefully assess future benefits while judging their return on investment (ROI).

Legal and regulatory compliance: Integrating IT with IoT poses significant legal and regulatory challenges that organizations must address. To ensure conformity with pertinent laws, regulations, and industry norms surrounding data privacy protection, security protocols guarding intellectual property rights and all technology-related aspects are crucial measures companies must take. Neglect following these requirements can lead to severe legal ramifications affecting an entity's reputation negatively.

Confronting these obstacles entails a profound understanding of technology, adept project management skills, engaging various stakeholders, and achieving harmonious cooperation between IT and business teams. Organizations must exercise great prudence while devising plans and evaluating potential risks to thrive through implementation.

UNIQUE CHALLENGES OF BPR IN THE USA – AN EXAMPLE OF A DEVELOPED COUNTRY

Organizations undertaking Business Process Reengineering (BPR) strategies that involve Information Technology (IT) and the Internet of Things (IoT) in the USA may encounter distinct challenges. Implementing BPR with IT and IoT is often complicated, requiring

companies to overcome several specific obstacles. These are some examples:

Data privacy and security regulations: Data protection laws in the USA, such as GDPR and CCPA, are highly stringent in their requirements for maintaining privacy and security. Companies utilizing IT/IoT systems must comply with guidelines when obtaining, safekeeping, and processing sensitive information. Keeping knowledge of stored data is integral for business success, but complying with regulatory standards may require effort while staying compliant with present laws governing such activity.

Cybersecurity threats: The USA faces significant cybersecurity threats due to its reliance on IT and IoT technologies. Implementing BPR initiatives incorporating these technologies requires robust cybersecurity measures to protect against data breaches, cyber-attacks, and unauthorized access. Organizations must stay updated with the latest cybersecurity practices, invest in cybersecurity infrastructure, and foster a culture of security awareness.

Infrastructure availability and connectivity: Continuous incorporation of IT and IoT solutions in BPR necessitates seamless, high-speed internet connectivity. Regrettably, rural areas may experience difficulty with both web access and constant connection compared to urban centers with better infrastructure. Interconnecting multiple locations with steadfast network collaboration and unfailing infrastructure will boost the fruitful implementation of BPR initiatives.

Legacy system integration: Many organizations in the USA still operate with legacy systems that may need to be more easily compatible with new IT and IoT technologies. Integrating these legacy systems with modern technologies can be complex and time-consuming. Organizations must carefully plan and execute the integration process to ensure seamless connectivity and data exchange between systems.

Skill shortages and talent acquisition: Implementing BPR with IT and IoT requires a skilled workforce capable of effectively managing and leveraging these technologies. However, the USA needs more IT and IoT professionals in specific domains, leading to talent acquisition challenges. Organizations must invest in training programs, partnerships with educational institutions, and talent development strategies to bridge the skill gaps.

Interoperability and standardization: Integrating various IT and IoT systems from different vendors may pose challenges in terms of interoperability and standardization. Ensuring that different systems can

communicate and share data seamlessly requires adherence to industry standards and protocols. Organizations must carefully evaluate technology providers, consider interoperability requirements, and promote standardization efforts.

Change management and resistance to change: BPR initiatives involving IT and IoT often disrupt existing processes and workflows, leading to employee resistance to change. Managing this resistance, fostering a culture of innovation, and effectively communicating the benefits of BPR are crucial. Organizations should invest in change management strategies, engage employees, and provide training and support to facilitate a smooth transition.

Cost considerations and return on investment: Implementing IT and IoT in BPR initiatives can involve significant upfront costs, including technology investments, infrastructure upgrades, and training expenses. Organizations must carefully assess the cost implications and evaluate the return on investment (ROI) to justify the financial investment in implementing IT and IoT. Identifying cost-effective solutions and long-term benefits is essential.

These challenges highlight the importance of thorough planning, risk assessment, stakeholder engagement, and regulation compliance when implementing BPR with IT and IoT in the USA. Organizations should consider these challenges as they develop strategies to address specific needs and optimize their processes effectively.

SPECIFIC CHALLENGES TO IMPLEMENTING BPR APPLYING IT AND IOT FOR DEVELOPING COUNTRIES

Implementing Business Process Reengineering (BPR) initiatives that incorporate Information Technology (IT) and the Internet of Things (IoT) in developing countries can present unique challenges. Here are some specific challenges that organizations may face when implementing BPR with IT and IoT in developing countries:

Infrastructure limitations: Developing countries often face infrastructure limitations, including unreliable power supply, inadequate internet connectivity, and limited access to technology. These limitations can hinder the implementation of IT and IoT solutions required for BPR. Organizations may need to invest in improving infrastructure, expanding internet access, and providing necessary technological resources to overcome these challenges.

Digital divide: Developing countries may experience a digital divide, with disparities in access to technology, digital literacy, and internet penetration. Implementing IT and IoT solutions for BPR may require efforts to bridge this divide, such as

providing training programs, promoting digital literacy initiatives, and ensuring equitable access to technology for all stakeholders.

Limited financial resources: Developing countries often need more financial resources, making investing in advanced IT and IoT technologies for BPR challenging. Organizations may need to explore cost-effective solutions, seek partnerships or funding opportunities, and prioritize investments based on the potential impact on business processes and outcomes.

Regulatory and policy frameworks: Developing countries may have evolving regulatory and policy frameworks related to IT and IoT. Organizations must navigate these frameworks to ensure compliance while implementing BPR initiatives. Working closely with regulatory authorities and understanding the legal requirements can help organizations overcome these challenges.

Skill gaps and talent development: Developing countries may need more skill gaps in IT and IoT expertise, which can impede the successful implementation of BPR initiatives. Organizations must invest in training programs, collaborations with educational institutions, and talent development strategies to build a skilled workforce capable of effectively managing and leveraging these technologies.

Cultural and organizational resistance to change: Traditional practices, cultural factors, and organizational resistance to change can pose challenges when implementing BPR with IT and IoT in developing countries. Overcoming resistance, fostering a culture of innovation, and effective change management are crucial. Organizations must engage stakeholders, communicate the benefits of BPR, and address concerns to ensure successful adoption.

Security and privacy concerns: Developing countries may have unique security and privacy concerns related to IT and IoT implementations. Data protection, privacy regulations, and cybersecurity measures need to be addressed to ensure the secure operation of IT and IoT systems. Organizations must prioritize data security, implement appropriate safeguards, and comply with relevant regulations.

Scalability and sustainability: Developing countries often have diverse and rapidly growing populations. It is essential to implement scalable and sustainable IT and IoT solutions to accommodate future growth and changing needs. Organizations should consider scalability and sustainability factors in their BPR initiatives to ensure long-term success and adaptability.

These challenges highlight the need for customized approaches, partnerships with relevant stakeholders, and a deep understanding of the local context when implementing BPR with IT and IoT in developing countries. Organizations must consider these challenges and develop strategies that address the region's specific socio-economic, technological, and cultural aspects to achieve successful outcomes.

SPECIFIC CHALLENGES TO IMPLEMENTING BPR APPLYING IT AND IOT IN BANGLADESH

Implementing Business Process Reengineering (BPR) initiatives that incorporate Information Technology (IT) and the Internet of Things (IoT) in Bangladesh can present specific challenges. Here are some of the challenges that organizations may face when implementing BPR with IT and IoT in Bangladesh:

Limited IT infrastructure: Bangladesh faces challenges related to limited IT infrastructure, including inadequate internet connectivity, power supply interruptions, and limited access to technology in certain areas. These infrastructure limitations can hinder the implementation of IT and IoT solutions required for BPR. Organizations may need to invest in improving infrastructure and connectivity to support implementing BPR initiatives.

Digital divide and low digital literacy: Bangladesh experiences a digital divide, with disparities in access to technology and digital literacy levels. Many individuals, particularly in rural areas, need more IT and IoT technologies exposure. Organizations may need to provide training programs, workshops, and initiatives to enhance digital literacy among employees and stakeholders, ensuring their effective participation in BPR initiatives.

Limited financial resources: Limited financial resources can pose a challenge when implementing BPR with IT and IoT in Bangladesh. Organizations, especially smaller enterprises, may need help investing in advanced technologies and acquiring necessary IT infrastructure. Creative financing options, partnerships, and government support programs can help overcome these financial challenges.

Regulatory and policy framework: Bangladesh has regulations and policies concerning IT and IoT implementation. Organizations must navigate these frameworks, including data protection, privacy, and cybersecurity regulations. Ensuring compliance with the legal requirements, engaging with regulatory bodies, and understanding the implications of the regulatory landscape are crucial steps in successfully implementing BPR initiatives.

Skill gaps and talent development: Bangladesh may face skill gaps in IT and IoT expertise. Organizations may

need help finding skilled professionals with the necessary knowledge and experience to implement and manage IT and IoT solutions. Investing in skill development programs, collaborating with educational institutions, and fostering a culture of continuous learning can help bridge these skill gaps and build a competent workforce.

Cultural and organizational resistance to change:

Traditional practices, cultural factors, and organizational resistance to change can be challenging when implementing BPR with IT and IoT in Bangladesh. Resistance to change may arise from a lack of awareness, fear of job displacement, or a preference for traditional methods. Organizations need to address these concerns through effective change management strategies, stakeholder engagement, and communication to ensure the successful adoption of BPR initiatives.

Security and privacy concerns:

Security and privacy concerns are crucial when implementing IT and IoT solutions in Bangladesh. Organizations must prioritize data security, develop robust cybersecurity measures, and comply with data protection regulations to ensure the integrity and confidentiality of sensitive information. Building trust among stakeholders through transparent practices can alleviate privacy concerns.

Sustainability and environmental considerations:

Bangladesh is highly vulnerable to climate change and environmental challenges. When implementing BPR with IT and IoT, organizations should consider sustainability aspects, such as energy efficiency, waste reduction, and environmental impact. Emphasizing sustainable practices in designing and implementing IT and IoT solutions can contribute to the country's environmental goals.

By addressing these specific challenges, organizations in Bangladesh can leverage the potential of IT and IoT to implement successful BPR initiatives. Collaborating with government bodies, engaging stakeholders, and building local partnerships can further support the implementation process in Bangladesh's unique context.

COMMON APPROACHES TO RESOLVE THE CHALLENGES

To overcome the challenges of implementing Business Process Reengineering (BPR) with IT and IoT in different contexts, such as the USA, developing countries, and Bangladesh, organizations can consider the following approaches:

Assess and address infrastructure limitations: In all contexts, assessing the existing IT infrastructure and identifying any limitations or gaps is essential. Investing in improving infrastructure, such as

internet connectivity, power supply, and technology access, can help overcome these challenges. Collaboration with government entities, private sector partners, and technology providers can facilitate infrastructure development.

Promote digital literacy and skill development:

Addressing the digital divide and skill gaps is crucial. Organizations should invest in training programs, workshops, and initiatives to enhance digital literacy among employees and stakeholders. Collaboration with educational institutions, vocational training centers, and technology companies can help bridge the skill gaps and develop a capable workforce.

Seek financial support and innovative financing options:

Limited financial resources can be challenging, particularly in developing countries and smaller organizations. Seeking financial support through government funding programs, grants, and loans can help overcome financial constraints. Exploring innovative financing options, such as public-private partnerships or technology-sharing arrangements, can alleviate financial burdens.

Navigate regulatory frameworks:

Understanding and complying with the regulatory and policy framework is essential. Organizations should stay informed about relevant regulations and engage with regulatory bodies to ensure compliance. Seeking legal advice and establishing clear data protection, privacy, and cybersecurity practices can help navigate the regulatory landscape.

Foster a culture of change and stakeholder engagement:

Overcoming cultural and organizational resistance requires effective change management strategies and stakeholder engagement. Communicate the benefits of BPR with IT and IoT to stakeholders, address concerns, and involve them in the decision-making process. Creating a culture of change, fostering open communication, and providing support during the transition can help overcome resistance and drive successful implementation.

Prioritize security and privacy:

Security and privacy concerns are common challenges. Organizations should prioritize data security and privacy by implementing robust cybersecurity measures, encryption protocols, and access controls. Conducting regular security audits, complying with data protection regulations, and building trust through transparent practices can mitigate security and privacy concerns.

Emphasize sustainability and environmental considerations:

Sustainability is crucial for organizations operating in any context. Implement energy-efficient technologies, promote waste

reduction and recycling practices, and adopt environmentally friendly approaches. Emphasizing sustainability can benefit the environment, contribute to cost savings, and enhance reputation.

Collaborate and share best practices:

Organizations can overcome challenges by collaborating with government entities, industry associations, and other stakeholders. Sharing best practices, lessons learned, and success stories can facilitate knowledge exchange and create a supportive ecosystem. Leveraging networks, participating in conferences, and engaging in public-private partnerships can foster collaboration and provide valuable insights.

Each context has unique challenges, and organizations should adapt strategies based on their specific circumstances. By addressing these challenges proactively and collaboratively, organizations can increase the likelihood of successful BPR implementations with IT and IoT.

CONCLUSION

The integration of Information Technology (IT) and the Internet of Things (IoT) in the pursuit of Business Process Reengineering (BPR) holds immense potential for organizations across a spectrum of contexts, ranging from the USA to developing countries like Bangladesh. This article has explored the scenarios and challenges of implementing BPR with IT and IoT in these diverse settings. The USA, with its advanced technological infrastructure, to developing countries like Bangladesh, facing unique socio-economic challenges, organizations can benefit from leveraging IT and IoT to drive BPR initiatives. However, it is crucial to acknowledge the specific challenges that each context presents.

In the USA, challenges such as complex regulatory frameworks, data security concerns, and resistance to change can impede the successful implementation of BPR with IT and IoT. Overcoming these challenges requires a focus on creating a supportive regulatory environment, prioritizing data privacy and security, and fostering a culture of innovation and adaptability.

In developing countries such as Bangladesh, where infrastructure limitations, digital literacy gaps, and financial constraints are prevalent, the key lies in addressing these challenges head-on. Building robust infrastructure, investing in digital literacy programs, seeking financial support from public and private sectors, and promoting collaboration and knowledge-sharing within the local ecosystem are crucial steps toward successful BPR implementations.

Pursuing BPR with IT and IoT requires a holistic approach regardless of context. It involves technological advancements and cultural, regulatory, and socio-economic considerations. Organizations must align their

strategies with their environment's specific needs and challenges, fostering collaboration between stakeholders and embracing change as a driver for growth and innovation. By empowering organizations through IT and IoT, organizations can reimagine their business processes, enhance operational efficiency, optimize resource allocation, and improve decision-making. The successful implementation of BPR with IT and IoT has the potential to drive economic growth, create employment opportunities, and contribute to the overall development of societies.

Organizations, policymakers, and stakeholders must collaborate and share experiences, best practices, and lessons learned as we move forward. By doing so, we can collectively overcome the challenges associated with BPR with IT and IoT and unlock the transformative power of technology to drive sustainable and inclusive development across diverse contexts, from the USA to Bangladesh and beyond.

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