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Promoting the Culture of Technology Adoption in Business Process Management:

The Role of CEO/Leadership to Attract Digital Investments Using IOTS

Fakhrullah*
Business School, Shandong Normal University,
Jinan, China
[*Corresponding author*]

Abbas Rehman
School of International Economics and Trade, Ms International Business,
Shandong University of Finance and Economics, Jinan, China

Muhammad Tariq
Senior Research Officer, Planning and Development Department,
Khyber Pakhtoon Khwa, Pakistan

Asif Khan
School of International Economics and Trade, Ms International Business,
Shandong University of Finance and Economics, Jinan, China

Sher Khan
Department of Information Management, Faculty of Management,
Comenius University, Bratislava, Slovakia

Asad Ullah
Department of Tourism & Hospitality, Abdul Wali Khan University,
Mardan Khyber Pakhtoon Khwa, Pakistan

Abstract
A well-known term for streamlining authoritative cycles and designs as new data enters an organization; Business Process Reengineering (BPR) is the subject of this research. To reap the benefits of data innovation (IT) in a company, a considerable rebuilding may be required. BPR is a topic that is often misunderstood. BPR will both benefit and harm associations. BPR and IT will be examined in connection to one another throughout the study's many stages (IT). Business practices are being reshaped by data technology on a massive scale. Faster, more efficient, and less expensive arrangements may be made at every step of the BPR cycle because to its utilization. The majority of the exam will be in writing. "New modern design" or "working more astute" is other terms for Business Process Reengineering (BPR). In order to enable reengineering work, they all entail the notion of synchronizing business process reengineering with data innovation (IT). Data innovation plays an important role in BPR, which will be explored in this paper. What administrators and presumptions may expect from BPR will also be examined in this paper.

Keywords
Business Process Reengineering (BPR), Organizational resources, Innovative thinking, Process function, Digital Investment using IOTS, Operational performance

INTRODUCTION

To reengineer business processes, businesses must be able to discern between eastern and western cultures. No process modifications can be done without defined goals and objectives. Focusing on the action itself improves an association's performance and results. BPR looks at existing business processes and restructures them to eliminate waste, raise skill level, and make interface improvements to increase intensity. In this way, BPR aims to enhance project management, human resources, and data technology. That means redesigning the association's business cycles. Major reengineering projects need a set of preconditions. The administration should not make substantial modifications to such systems starting with the rules and procedures in place at the time. They should do more to increase their authority and production standards. The association's renovation and redesign should begin today. MIT started providing BPR as an experimental program in the mid-1990s. Davenport and Short (2010) used the word in their research. Using current data innovation makes administrative and creative processes, as well as the job done, more worldwide. The study and planning of work processes and cycles both inside and across enterprises is described by Davenport (2013). DAWNPORT (2013). Businesses should be broken down into processes to increase efficiency in both the assembly and administration phases of the manufacturing process. Experts say there isn't general agreement on what BPR genuinely means. Reengineering the firm: Most BPR academics consider Hammer and Champy's (2013) a manifesto for corporate transformation an early BPR phase. They think BPR means: Reengineering may be done to drastically enhance a company's processes. Amazing improvements in cost, quality, and management. Dr. Michael Hammer, the idea's main architect, directed the reengineering process. He examined and refined this thesis in "Reengineering Work: Don't Automate, Obliterate," Harvard Business Review, 2010.

By breaking away from established cycles, BPR hopes to improve job completion, personnel organization, and IT frameworks for the next cycle. The movement finishes by identifying essential business processes, dissecting them, and updating them to improve and gain an advantage. Vidgen (2014) characterizes the focal central issues of BPR as:

- Radical change and presumption challenge
- Process and objective direction
- Organizational rebuilding
- The abuse of empowering advancements, especially data innovation
- Which implies that by zeroing in on business targets, processes are investigated in the association, unimportant or excess systems are killed, and afterward IT is utilized to update and smooth out hierarchical?

LITERATURE REVIEW

Dumas et al. define business process management as "the science and practice of controlling how work is done to assure consistent outputs and take advantage of improvement possibilities" (2018). The ultimate aims include efficient business process execution and management, as well as the growth of BPM expertise inside businesses (Harmon 2018; Rosemann and von Brocke 2015a, b). Successful BPM involves expertise in strategy alignment, governance, methodologies, IT, people, and culture to apply process orientation in enterprises (Roseman and vom Brocke 2015c). According to the researchers (Poppelbuß et al., 2015) Changes in processes may be made gradually or in a dramatic way by using BPM. BPM and IOT use a variety of front-end devices to build edge networks consisting of static or mobile devices (e.g. collaborative sensing). A cloud-based IOT ecosystem is often implemented.

When it comes to (Poppelbuß et al., 2015) BPM is a collection of skills and processes that may be used to implement both incremental and drastic changes in a process. "Exploring the link between information technology, infrastructure, and business process re-engineering," by Ganesh D. Bhatt, shows that BPR cannot function without IT. Marta Fossas Olalla (2000) stresses the importance of IT in business process reengineering. A significant BPR deployment, as described by Hammer (1990). When it comes to using IT, the goal is to challenge long-held assumptions about how things are done at work, according to him. For BPR to be successful, it requires a wider view of IT and business operations, according to Davenport & Short (1990). Rather than just automating or mechanizing an organization, IT should be used to reshape it. The function-based approach has been replaced with a process-based one known as BPR. In BPR, IT is essential for radical process transformation. It is widely accepted that IT is a critical component of BPR (Hammer and Champy, 1993).

Adopting a new policy or practice might be difficult because of the behavioral consequences. In the traditional BPR radical transformation plan, many methods are used to identify new ideal processes and fast implement them (Hammer, M. 1990; Hammer, M., and Champy, 1993). It takes authority, knowledge, and effective communication with all stakeholders to manage organizational opposition to BPR adoption (Hammer and Champy, 1993, Stanton et al., 1993). The need to "look outside" for fresh product ideas and technologies has raised in tandem with an increased emphasis on organic development approaches (Chesbrough, 2003; Nambisan & Sawhney, 2007). The IOTSS is much ahead of its time, and we believe it makes a substantial contribution to survey research on digital inclusion by offering a valuable set of questions that other researchers may use to start surveys on IOT-skills. However, we don't want to give the impression that this is the final product in this case. Ideally, we'll evaluate the items in all five of these theoretically separate skill areas over the following several years (van Deursen, A. J., van der Zeeuw, A., de Boer, P., Jansen, G., & van Rompay, T. 2021).

Innovative progress, intellectual stimulation, the empowerment of followers, idealized influence, and inspirational motivation are all characteristics of transformational leadership. Transformational leadership (Zaman, et al 2019). Leaders that inspire their employees to go above and beyond have a positive impact. Personal and organizational benefits include enhanced team composition and productivity (zaralli, N., 2003). Transformational leaders who cultivate a sense of self-actualization and self-esteem in their employees inspire workplace innovation and creativity (Jung, D.D.; Wu, A.; Chow, C.W., 2008). The hardware and software components that make up an information system's architecture are both included in information technology. There are several ways in which evidence might affect our expectations or views of what is possible.

MATERIALS AND METHODS

This research study is divided into two section: Qualitative section which enlighten the brief description of mechanism of IOTS and its characteristics and features where's quantitative section explain how the different characters of leadership helps in attracting the digital investments using IOTSS.

QUALITATIVE SECTION

People, animals and machines that have unique identifiers and can transfer data over a network without human-to-human or computer interaction are called "things" in this context. Any natural or man-made device that can be issued an IP address and transmit data across a network, such as a human with an implanted heart monitor or an animal with a biochip transponder, is an example of anything in the internet of things.

If you're in the business of generating money, IOTS are a great way to boost efficiency, improve customer service, and make smarter decisions.

Connected physical objects may be identified by other devices through the internet of things, which connects physical objects to the internet (IOTS). This umbrella phrase includes RFID, but other sensor technologies, wireless technologies, or QR codes may also be included.

Some most popular characteristics of Internet of things are explained below:

Intelligence: Software and hardware combine to make IOTS smart and helpful. As part of IOTS, ambient intelligence helps things respond intelligently to situations and perform tasks more efficiently. Traditional input mechanisms and graphical user interfaces are employed for user-device interaction in IOTS.

Algorithms and computers make a thing "smart" (software and hardware). Consider the Misfit Shine fitness tracker and the Nest smart thermostat. The Shine experience aims to distribute processing between a smartphone and the cloud. The Nest thermostat's AI is more powerful.

Connectivity: In order to make the Internet of Things a reality, it is necessary to link everyday objects. The IOTS network's collective intelligence is enhanced by even the simplest of object-level interactions. It makes it easier for devices to communicate with one another via a network. The Internet of Things may provide new business opportunities if smart gadgets and applications can be linked together. The IOTS has more than simply a Wi-Fi module when it comes to connectivity. Network compatibility is made possible via connectivity. Data consumption and production are examples of compatibility, while access is the ability to join a network. If Metcalfe's Law rings a bell, it's because IOTS is governed by it.

Dynamic Nature: The Internet of Things receives data from its surroundings due to frequent changes. These gadgets' states (sleeping, waking, and connected/disconnected) and context (temperature, location, and speed) are continually changing. The number of devices and their condition vary depending on the user, location, and time.

A device's status changes dynamically as it sleeps or wakes up, connects or disconnects, or moves across space or time. The overall number of devices may also change.

Enormous scale: A far larger number of devices must be managed and communicated to than the current Internet can handle. Devices like smartphones and tablets have made data management and application interpretation critical. Gartner (2015) predicts that in 2016, 5.5 million new products will be linked every day, with 6.4 billion connected things in use worldwide, an increase of 30% over 2015. According to the report, 20.8 billion connected devices will exist by 2020.

The number of devices that will need to be managed and communicated with will be several times more than the current Internet's capacity to manage and connect with today. Data management and application interpretation will be much more critical in the future. This has to do with the semantics of data and the efficient administration of data.

Sensing: A sensor is a device that can detect and measure changes in the environment and utilize that data to report on their state or even interact with it. Using sensing technologies, one may get information about the physical world and its inhabitants. Sensory information is primarily analogue input from the physical world, but it may reveal a lot about our complex reality.

The world and people around us are often taken for granted, which may lead to misunderstandings. Our knowledge of the physical environment and the people who inhabit it may be represented via sensing technologies. We can understand our complex reality by using simply the physical world's analog input.

Heterogeneity**:** Heterogeneity is an important component of IOT. IOTS devices may connect to other devices or service platforms through networks. IOTS should facilitate interoperability across diverse networks. Scalability, modularity, extensibility, and interoperability are important IOTS design criteria. The IOTS devices are multi-platform and multi-network. They can network with other devices or platforms.

***Security*:** IOTS devices are inherently insecure. It would be a mistake to ignore the IOTS's security concerns while we gain efficiency, new experiences, and other advantages. IOTS has significant transparency and privacy problems. Securing endpoints, networks, and data entails building a security paradigm.

Data Availability: You'll see IOT devices everywhere. Everything around us is becoming web-enabled, from cars and refrigerators to factory monitoring devices. According to Juniper research, over 50 billion IOTS sensors and devices will be in operation by 2022. Businesses are quickly adopting IOTS devices due to the enormous savings possibilities, while consumers may benefit. Using IOTS devices throughout the production process allowed Harley-Davidson to save 7% on costs while improving net profits by 19%.

Data Integrity: IOTS connects billions of devices in a linked ecosystem. The whole data stream from the sensor to the central server is affected by the manipulation of a single data point. Digital signatures and a decentralized distributed ledger are both necessary for maintaining integrity.

***Encryption Capabilities*:** Encrypting and decrypting data is a continuous operation. The IOTS network's sensors can't handle data. Attacks may be avoided by firewalls and network segmentation.

***Privacy Issues*:** It's all about exchanging data across devices, platforms, and consumers under the IOTS model. The ultimate goal of data collection by smart devices is to increase efficiency, user experience, decision-making, and customer service.

***Common Framework*:** Since no standard exists, each manufacturer must deal with security and privacy problems independently. Individual efforts may be merged in an extendable fashion if a shared, standardized framework is in place.

Automation: A growing number of IOTS devices will eventually overwhelm organizations. The sheer volume of user data might be overwhelming. It is undeniable that a single algorithm or mistake may bring down the whole data infrastructure. [22].

Updating: Not all devices enable over-the-air updates, thus they must be manually updated. Keep track of all available updates and apply them to all devices. This procedure is time-consuming and complex, and any errors will lead to security flaws later. Security investing in infrastructure and network security should be the primary priority, but it isn't. IOTS uses millions of data points, each of which must be safeguarded. Multi-layer security is required, i.e. security at all levels. IOTS (Internet of Things) devices, cloud platforms, embedded software and online and mobile apps should all be secure. Security gets difficult with diverse devices.

Analysis and determination of IOTS:

Table 1 Need of Research

Technology	Future Development	Research Needs
Hardware Devices	•Nanotechnology •Miniaturization of chipsets •Ultra low power circuits	•Low cost modular devices •Ultra low power EPROM/FRAM •Autonomous circuits
SENSOR	•Smart sensors(bio-chemical) •More sensors (tiny sensors) •Low power sensors •Wireless sensor network for sensor connectivity	•Self-powering sensors •Intelligence of sensors
Communication Technology	•On chip antennas •Wide spectrum and spectrum aware protocols •Unified protocol over wide Spectrum •Multi-functional reconfigurable chips	•Protocols for interoperability •Multi-protocol chips •Gateway convergence •On chip networks •Longer range (higher frequencies – tenths of GHz) •5Gdevelopments
Network Technology	•Self-aware and self-organizing networks •Self-learning, self-repairing networks •IPv6- enabled scalability •UbiquitousIPv6-based IOTS deployment	•Grid/Cloud network •Software defined networks •Service based network •Need based network

Software and algorithms	•Goal oriented software •Distributed intelligence, problem solving •User oriented software	•Context aware software •Evolving software •Self-reusable software •Autonomous things: •Self-configurable •Self-healing •Self-management
Data and Signal Processing Technology	•Context aware data processing and data responses •Cognitive processing and optimization •IOTS complex data analysis •IOTS intelligent data visualization •Energy, frequency spectrum aware data processing	•Common sensor ontology •Distributed energy efficient data processing •Autonomous computing
Discovery and Search Engine Technologies	•Automatic route tagging and identification management centers •On demand service discovery/integration	•Scalable Discovery services for connecting things with services
Security & Privacy Technologies	•User centric context-aware privacy and privacy policies •Privacy aware data processing •Security and privacy profiles selection based on security and privacy need	•Low cost, secure and high performance identification/ authentication devices

The Internet will be used as a communication and information sharing platform by IOTS in order to link the physical and virtual worlds. Data produced by IOTS resources is hindered by the wide range of devices and communication technologies that underlie them. Future networks will also be varied and dispersed, as was the case with the IOTS. Non-interoperability concerns increase as a consequence. In the Internet of Things, interoperability is a big concern (IOTS). There are various systems (devices, sensors and equipment) that need to interact and share information in the IOTS, which makes it difficult for global agreements and widespread acclaim to be reached because of the IOTS' inherent high-dimensionality and heterogeneity. As a result, IOTS interoperability is a complex topic. Interoperability is defined as "the ability to exchange data and use information" across different systems. This concept intrigues me since it encourages us to gather, share, and analyze data. Technical, syntactical, semantic, and organizational interoperability are all examples of interoperability.

A simple representation of interoperability is shown in figure 0

Technical interoperability refers to the capacity of hardware and software components to communicate with one other. An important part of this interoperability is protocols and accompanying infrastructure.

In many cases, data formats are tied to syntax. Messages delivered across communication protocols must have a predetermined structure, regardless of encoding or grammar. Many protocols employ high-level transfer syntaxes like ASN.1 and HTML to describe data or content.

Semantic Interoperability is usually associated with the meaning of content and concerns the human rather than machine interpretation of the content. Thus, interoperability on this level means that there is a common understanding between people of the meaning of the content (information) being exchanged.

While businesses may use diverse information systems, infrastructures, and cultures, interoperability allows them to efficiently interact and transfer data (meaningful data). Technical, syntactical, and semantic interoperability are required for organizational interoperability.

Table 2 IOTS Layers

IOTS Layer	Security Requirements
Application	• Application-specific Data Minimization • Privacy Protection and Policy Management • Authentication • Authorization, Assurance • Application specific encryption, cryptography.
Services support	• Protected Data Management and Handling (Search, Aggregation, Correlation, Computation)

	• Cryptographic Data Storage • Secure Computation, In- network Data Processing, Data aggregation, Cloud Computing
Network layer	Secure Sensor/Cloud Interaction; Cross-domain Data Security Handling Communication & Connectivity Security
Smart object/sensor	• Access Control to Nodes • Light weight Encryption • Data Format and Structures • Trust Anchors and Attestation

Future Determination with Equations: The Internet of Things is a rapidly expanding technology that is extensively utilized in everyday life. As the IOT technology development phase accelerates, experts are increasingly focused on performance difficulties. In the next section, we review previous methods to performance assessment, particularly in the domain of IOT services.

Measurement-based approaches: The most straightforward way to assess IOT systems is to assess their efficiency. To attain performance metrics, measurement based performance assessment technique designs and executes few physical equipment or computer programs. Since all performance data gathered is precise and dependable, measurement-based procedures are the most verified and natural way for evaluating system performance.

Only a few studies have been done on IOT performance measurement. Stusek et al. (2015) tested many OSGi-based IOT frameworks. Hardware and software testers were practical and useful for allowing inclusive measurement inside systems. Chen and Kunz (2016) used a hardware-based tested and network emulators to examine the various IOT protocols. Wang et al. (205, 2016b) researched the trust management problem of quality of service (QOS) measurement data (user feedback ratings), which substantially improves and advances the performance assessment technique by 50%.

Prediction-based methods: It's becoming more difficult to evaluate dispersed service performance as the internet service population rises. Analyzing every service on the market is time-consuming and expensive. Prediction-based method is stressed in these situations. A method that makes use of data from previous customers to predict how well a service will work in the future (Wan et al., 2010). When evaluating large-scale services that rely on computer systems, it is particularly useful since it accommodates missing data.

QOS (Quality of Service) prediction methods are becoming more popular in IOT contexts. Luo et al. (2016) devised a data-driven method for large-scale web service-based IOT systems to deal with this problem. They found that we used a kernel mechanism learning approach to identify the hidden relationship between all of the existing QOS data and the most comparable QOS data, on which unknown QOS values were projected to appear.

Wang et al. (2016) employed a model-based strategy to predict QOS in a mobile service scenario. Research is further aided by the fact that internet service performance has been predicted for years. Zheng et al. (2013) projected that collaborative filtering techniques will be used to derive personalized web service QOS values. A network-aware web service for QOS prediction has been developed by Tang et al. (2016) by integrating matrix factorization with the help of networking maps.

Model-based tactics: Many computer systems already use performance prediction algorithms, but more data is needed. Predicting computer system performance before design and implementation is difficult. The system's structural and dynamic qualities must be leveraged to overcome this restriction. Many scholars have suggested a revolutionary model-based computing strategy to solve this issue. Create a mathematical model to study the system or service's behavior. This strategy saves time and money by avoiding the need to design and implement expensive systems and services. Matos et al. (2013) analyzed web service performance and reliability using a Markov chain model. For example, Xia et al. (2015) observed that the Markovian queuing model well described the numerous true features of IAAS clouds. To schedule service-oriented IOTs, Li et al. (2014) used the M/M/k queuing model. A quantitative simulation model for assessing IOT service performance was developed by Hsu et al. (2015) using System Dynamics. Zhang et al. (2016) provided probabilistic models for analyzing IOT performance as advanced heterogeneous networks with fractional spectrum consumption for further study into QOS provisioning.

Though widely used, the performance evaluation method has only been investigated in a few circumstances. A complete examination of IOT systems is still absent, especially when designed according to the advantage computing paradigm. Model parameters and task distribution are yet unknown. Hence, in order to fill knowledge gaps, we'll focus on performance evaluation designs.

Fundamental models of IOTs services: This chapter will focus on the basic models of IOT services and systems. As opposed to queuing models, queuing network models represent the active dynamic characteristics of atomic IOT services. We shall now discuss basic model parameters and their analytical methods.

Queuing model of atomic service: In an IOTs system, atomic services perform many tasks. Some sensor nodes implement numerous sensing services to gather data from physical environment and provide it to nodes in higher levels for further processing. Another example is data analytics services in data centers, which are usually deployed on strong servers and able to analyze massive data efficiently.

An atomic service's dynamics has three fundamental components. First, the service nodes receive requests to do a certain job as specified by the senders. These might be systematic sensor sensing tasks, basic sensor data computations on servers, or complicated data processing in data centers. And resources are few. Due to the lack of resources, requests must be queued until the service is ready. If resources are available, requests are processed promptly. Third, requests are handled and then exit the system.

A queuing model may represent an atomic service with dynamic characteristics. Figure 1 depicts a queuing model for IOT services. A circle symbolizes a service, and an open box represents a buffer (queue) before it, with slots representing pending requests. They are conceived of as entering and leaving the service queue, and it is expected that the service procedure normally takes a positive amount of time.

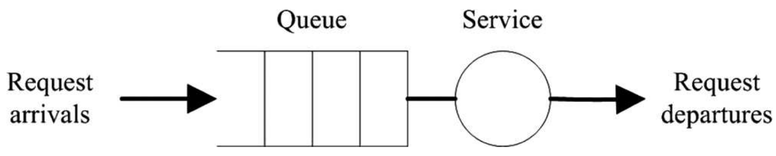
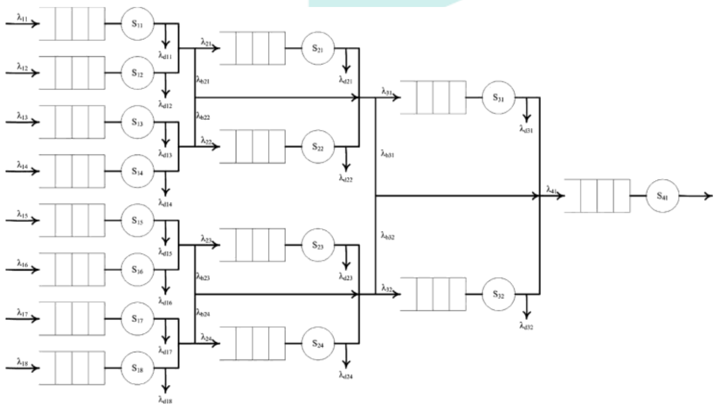


Fig. 1 Queuing model of atomic service

In the Discrete Event System (DES) paradigm, "events" are a sequence of arrival and departure occurrences that may be modeled. If we want to be more precise, we may describe this model as having only positive integers in its state space. When working with stochastic mechanisms (automata), we use the basic clock sequence (X (t) = 0, 1, 2, to control each state. A stochastic series of Y1, Y2, etc., is associated with arrival procedures, where the time gap between the (k-1) Th and (k-1) Th arrivals is YK (K 1) and Y1 is the arrival time.

There is a stochastic sequence related with the departure method, in which the random variable Zk (K – 1) represents the service time needed for the kth request, and Z1 and Z2 are linked. YK is assumed to be independent and uniformly distributed for the sake of generality; as a result, the probability distribution is described by (1), which may be used to expand on the interracial time sequence, an important model parameter that will be discussed in the next sections. The average arrival rate may also be explained by the inverse of the mean value of A (t) using the notation (2).

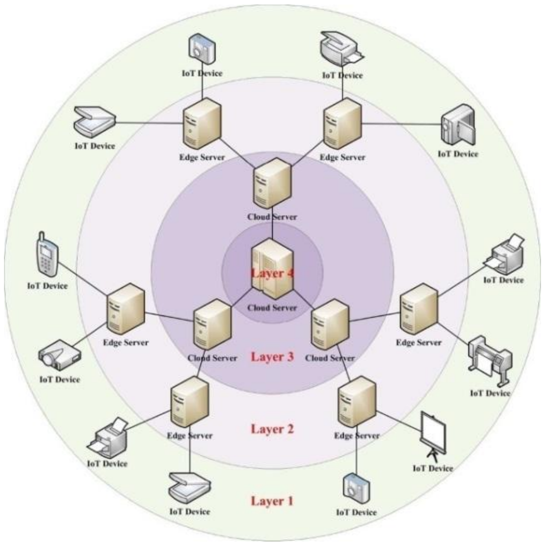
$$A\ (t) = Pr(Y \leq t)$$
$$\mu \equiv 1\ /E[Z]$$



Queuing discipline governs the order in which server's process select requests. This attribute affects the mathematical properties of queuing systems. FOCUS is a prevalent queuing discipline in modern service systems, including IOT situations (FCFS). This post will only address this subject. We utilized the kth request response time to calculate SK (from the time of arrival up to the time of departure). Little's Law provides an all-purpose constant state performance analysis of queuing systems with any stochastic clock topology.

$$E[S] = 1\ /\ \lambda\ E[X]$$

Queuing network model of IOTS systems: IOTS devices and the cloud are introduced to new in-between edge layers that handle workload and services locally in segments using the edge computing paradigm (Deng et. al., 2016). Redistributive servers, like cloud servers, are used in the intermediate layers. We explained it since it is common for cloud servers to be structured in a hierarchical fashion. Figure 2 depicts the hierarchical structure of the IOTS system. Directly linked to devices, the second tier of servers consists of edge nodes. Edge servers' workloads are handled by the third tier of cloud servers. The number of levels in an organization may vary. As a result, a number of connections may fall through the cracks in the system. Certain cloud-centric solutions allow physical devices to connect directly to centralized cloud servers (Lauro et. al., 2012).



For each service, a two-dimensional matrix is created, with the first i1, l representing the service layer and the second j representing each service individually. 2) We allow the arrival rate of services to be ij. End of Sij, dij shows the system request departure rate, and bij shows the bypass request rate from Sij to its upper-layer node. Thus, the interval arrival rate of requests may be planned based on the logical solution of the queuing model services.
For instance, consider the queuing network in Figure 3, the arrival rate of service S21 can be obtained by;

$$E[S] = 1/\lambda\ E[X] = 1\ Pn1\ j=1/\lambda 1j\ E\ \ X\ l\ i=1\ Xni\ j=1\ Xij$$

The performance of an IOTS system may be modeled using the ideas listed below. On the one hand, performance may be evaluated using numerical approaches. It is possible to use discrete event simulations using models that depict dynamic performance of the IOTS system while dealing with varied setup and parameter settings. Some well-organized software tools for general queuing network research are feasible in addition to DES simulations. Q-MAM (Van Velthoven et al., 2007) and Q-Net Approximate (Veatch, 2005) are two of the best software solutions.

Analysis may be used to answer issues requiring new statistical distributions of arrival and departure requests, or assumptions based on these distributions. Mathematical optimization considerations may be used to describe IOTS system design and development. Simplicity necessitates allowing certain assumptions to be made. Analytical solutions, even if simplified, may give useful references for system behavior, leading to system design and optimization with a focus on cost efficiency. So, the system performance evaluation is extremely exceptional because of the mathematical analysis. Analytical model solutions are obtained using mathematical distributions in this section.

Performance analysis of IOTS Services: The analytical solutions of queuing models relied on just a few assumptions regarding request arrivals or service timings. Only a few assumptions are required to arrive at solutions, and even fewer are low-bound estimates of critical performance variables. Many assumptions will be discussed in the next section. The study may predict IOT system performance. As a consequence, the system design is optimized.

Markovian queuing models: In distributed systems, task arrival above the session level may be expressed as a Poisson distribution (Chlebus and Brazier, 2007). Because of its exponential distribution and low memory feature, this distribution is often used in stochastic modeling and analysis of DES. These properties enable us to create a Poisson process using Markov chains, which are considerably simpler to analyze. However, assumptions are formed in performance assessment for several reasons. In queuing theory, the relative variation of service time is denoted by cB = Z E[Z]. For exponential distribution, E [Z] = 1 and cB = 1. The standard deviation of the service time as a random variable is equal to the average, which is a big amount in reality. A queuing system with same arrival distribution and cB value 1 would have shorter average queue length and hence shorter reaction time (improved performance). To make our model more realistic, resilient, and robust to tight optimization criteria, we will apply this assumption in the next section of this study.

A birth-death Markov chain can model the dynamics of an atomic service with Poisson arrivals and exponential service times. J. Huang et al. use the birth and death rates respectively. The underlying basic Markov chain is assumed to be stable. Thus, to solve the Markov chain using the little's Theorem, the queuing system may be theoretically examined as follows:

$$.\rho \equiv \lambda/\ \mu$$
$$\pi i \equiv \text{limit}{\to}\infty\ P\ r\ (X(t) = i) = (1 - \rho)\ \rho\ i$$
$$q \equiv E[X] = \rho\ /1 - \rho = \lambda\ /\mu - \lambda$$
$$T \equiv E[S] = 1/\ \mu - \lambda$$

We shall broaden the approach of the queuing network model by using an analytical solution technique for basic atomic services. Using Burke's theorem, an exponentially distributed Poisson arrival process to a server yielded an exponentially distributed Poisson departure process. Furthermore, Jackson's theorem finds a product resulting from the arrival solution that allows us to consider each service node independently in the Markovian queuing network model. The average network queue length is (11), while the average analytical solution response time is (12).

$$q \equiv E[X] = E \quad X\, l\, i=1\, Xni\, j=1\, Xij = X\, l\, i=1\, Xni\, j=1\, E[Xij\,] = X\, l\, i=1\, Xni\, j=1\, \lambda ij\, \mu ij - \lambda ij\,;$$
$$T \equiv E[S] = 1\, \lambda\, E[X] = P\, l\, i=1\, Pni\, j=1\, /\lambda ij/\, \mu ij - \lambda ij\, Pn1\, j=1\, \lambda 1j$$

We are now focusing on non-Markovian event processing in IOT systems. An IOTS service detects events and uploads data deterministically. Another example is when several sensors provide data to a single sensor hub for processing, resulting in a normal or exponential distributed arrival. Assume that there is no memory-less (Markovian) quality. That complicates the model analysis. System service time is assumed to be exponentially distributed. The semi-Markovian representation helps discover exceptional embedded Markovian time points to solve the queuing model analytically. Pre-request embedded time points The IOTS performance model. It is necessary to investigate distributed arrivals and exponential service times. Let Elk be the number of requests served before k, and Dk+1 be the number of requests served between k and (k + 1). As a consequence, the following equation connects them.

$$Lk+1 = Lk + 1 - Dk+1$$

Since the service processes are assumed exponentially distributed, the sequence {L1, L2, . . .} naturally forms a Markov chain at the embedded time points. Its transition probabilities are defined as (14)

$$pij = Pr\,(Lk+1 = j|Lk = i),\ i \geq 0,\ j \geq 0$$

Pij = 0 for every j > I + 1. To calculate pij, divide the number of interracial requests by the number of interracial requests. Since the probabilities of transitioning from one state to another should sum up to one, the preceding equations may be used to calculate pij. Finally, pij is defined as follows, where FY (•) is the interracial times probability density function.

$$pij = \{\ 0;\ j > i + 1;\ Z\infty\ t=0\ (\mu t)\ i-j+1\ /(i - j + 1)!\ e\ -\mu tfY\ (t)dt;\ 0 < j \leq i + 1;\ 1 - X\ i+1\ k=1\ pik;\ j = 0$$

With the transition probabilities, one can obtain the following equations of the stationary distribution ν = [ν0, ν1, . . .] of the embedded Markov chain

$$v0 = X\infty\ i=0\ vipi0;\ (16)\ vn = X\infty\ i=0\ vn+i-1\ Z\infty\ t=0\ (\mu t)\ i\ i!\ e\ -\mu tfY\ (t)dt,\ n \geq 1;\ (17)\ X\infty\ i=0\ vi = 1$$

We solve the Eqs. (16)–(18) and yield the solutions, which have the following form:

$$vn = (1 - \sigma)\sigma\ n$$

where σ is the unique root of Eq. (20) in the range of 0 < σ < 1. Here, Y˜ is the Laplace Stilettoes transform of the interracial time, i.e. Y˜ (s) = R∞ t=0 e −stfY (t)dt

$$\sigma = Y\tilde{}\ (\mu - \mu\sigma)$$

Therefore, the steady-state probabilities of the semi-Markovian queuing system in each state can be obtained by (21).

$$\begin{aligned} \pi i &= Pr(X > i - 1) - Pr(X > i) \\ &= \rho\ [Pr(L > i - 2) - Pr(L > i - 1)] \\ &= \rho vi-1 \\ &= \rho(1 - \sigma)\sigma\ i-1 \end{aligned}$$

Finally, the average response time within an atomic service can be calculated using Little's law by (22).

$$T = 1/\ \lambda\ E[X] = 1/\ \lambda\ X\infty\ i=0\ i \cdot \pi i = 1\ \lambda \cdot \rho\ 1 - \sigma = 1\ \mu(1 - \sigma)$$

With the queue lengths of all the atomic services, the overall performance metric can be easily obtained using Little's law on the queuing network model as shown in (6).

MAIN TEXT: For hierarchical service computing systems, we'll demonstrate how the analytical models and discoveries from the edge computing paradigm may be put to good use. Resource management and scheduling are two of the most often discussed topics in this forum. Basic problem formulations and associated solutions are provided, based on previous research results.

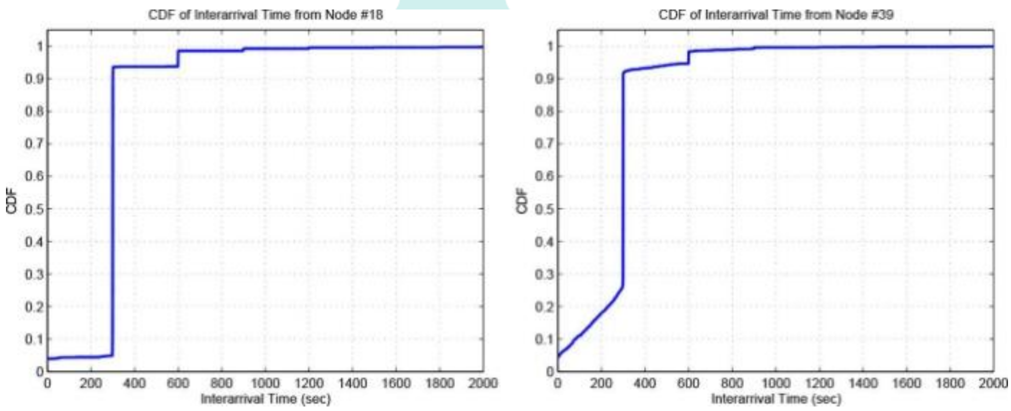
One or more physical servers may need to be allocated or used to their full capacity in order to meet the demands of the users. To meet their service-level agreements (SLAs), several researchers in this subject examine the allocation of virtual resources to diverse services (Chen et al., 2012). In our queuing network model, we may consider resource management to be a problem with service rate optimization since it has such an impact on service performance. Optimizing service pricing in different hierarchies is the objective of maximizing service provider income. For IOTS services, we provide a straightforward resource management paradigm. Instead of delving further into the problem of resource management, we want to demonstrate how our modeling approach may possibly drive system development and optimization. We're not going to go into particular mechanisms for allocating and dispatching resources here. Service providers are concerned with satisfying their service level agreements (SLA) using as little resources as possible. Optimization is an issue in resource management.... The previously provided service charges serve as input arguments. IOTS devices (e.g. sensors and controllers) are typically outside the control of resource management in services computing systems since their performance is often determined by the hardware. Service providers that rent virtual machines with certain configurations save money by using fewer resources. The system's maximum overall average response time, or SLA, establishes the restrictions (TSLA). Optimization is stated mathematically in this scenario.

$$\text{Minimize } \mu ij\ ,i>1\ c(\mu ij\ )$$
$$\text{Subject to}$$
$$T \leq TSLA$$

In order to tackle the issue, many optimization strategies may be used. Traditional mathematical optimization approaches may be used to discover the ideal arrangement in circumstances when analytical answers are available. However, heuristic search or ordinal optimization approaches may be used to tackle the issue with a high degree of efficiency when performance indicators can only be assessed via simulations. An application of our theoretical studies and current optimization theories to the resource management issue in an IOTS service system is then presented as a case study.

Organizational structures: Hierarchical task scheduling Organizing tasks is another trendy issue that has piqued the interest of academics and industry experts alike. It aims to find the best way to distribute requests to various services and servers in order to maximize profitability while satisfying user needs. What determines the arrival of services on physical or virtual servers is task scheduling in our models. The restricted non-linear optimization problem may also be used to design our model's task scheduling. As a starting point, arrival rates above the second layer are used as a measure of the cost of providing services. There are two sections to the limitations. First, the SLA must be met, which is specified in terms of an upper limit on the average response time. To begin with, all demands coming into the system must be met, and this includes those coming in from outside the system as well. The job scheduling optimization issue is formulated as follows:

$$\text{Minimize } \lambda ij\ ,i>1\ c(\lambda ij\ )$$



Performance modeling and analysis for IOTS services 161 subject to $T \leq TSLA$; (39) X l i=2 Xni j=1 $\lambda ij \geq$ Xn1 j=1 $\lambda 1j$. (40) Similar to the previous part, we present an example to illuminate how to solve the problem with our models.

Results of Qualitative Section

Empirical results: In this part, we test our models and analysis using real-world data. The output data from discrete event simulations with actual workload are utilized to test the theoretical analysis' validity.

Data set: Our model's effectiveness is simulated using Microsoft Research's T-Drive data (Yuan et al., 2010). GPS recorders and GPS phones in cabs acquire this data. It includes the GPS trajectories of 10,357 taxis in Beijing during a week in 2008. 15,000,000,000 DATA POINTS & 9,000,000 Km TRAJECTORIES The GPS data includes longitude and latitude, as well as a timestamp that marks the precise minute it was delivered to the system. To model and analyze tasks, these timestamps provide detailed task arrival information from numerous sensors. Since GPS services receive significant volumes of GPS data from geographically dispersed sensors and calculate item locations, we use T-Drive data to evaluate performance. The GPS sensors sample every 1–20 minutes, depending on the data set's arrival patterns. Statistically, we study task arrival distributions.

Figure 4 shows the time interval distributions between two sites in two automobiles. The first subfigure displays the cumulative distribution function (CDF) of the interracial time produced from the cab ID #18. Given that roughly 90% of time periods are precisely 300 seconds, the GPS sensor mounted on the cab often sends its sensing data every 5 minutes. 5% of the data is 0 and 4% of the interracial times are 600. Unusual duplicate transmissions and packet losses may be the reason. In a stable state, the inter arrivals are roughly predictable. Examining the data set, we discover that it is mostly identical to this example. The second subfigure in Figure demonstrates that certain data distributions are less stair-like. The CDF shows that over 95% of the data is between 0 and 10 min (600 s), and that each data point may be any value, notably between 0 and 300 s.

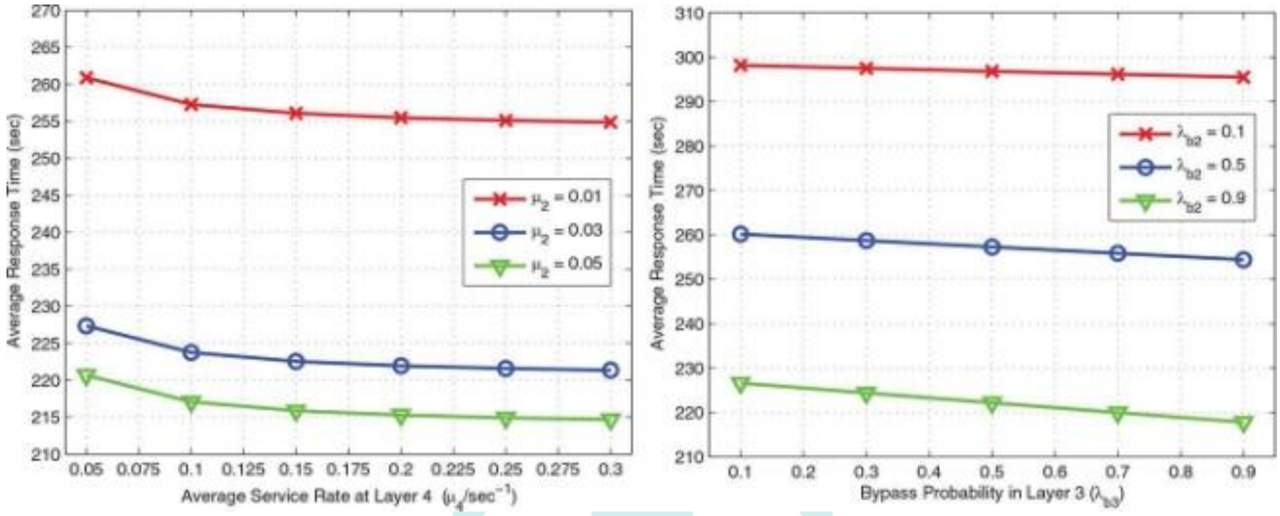


Fig. 4 Distributions of interracial times on sensors (see online version for colors)

We also mimic a sensor hub receiving data from numerous IOTS devices by aggregating arrivals from ten random cabs. Figure 5 shows the aggregated arrivals' PDF and CDF. The PDF is clearly not a mathematical distribution, but we can approximate it as an exponential. Thus, any distribution functions may be included in our prior studies to make the assumptions and assessments more realistic.

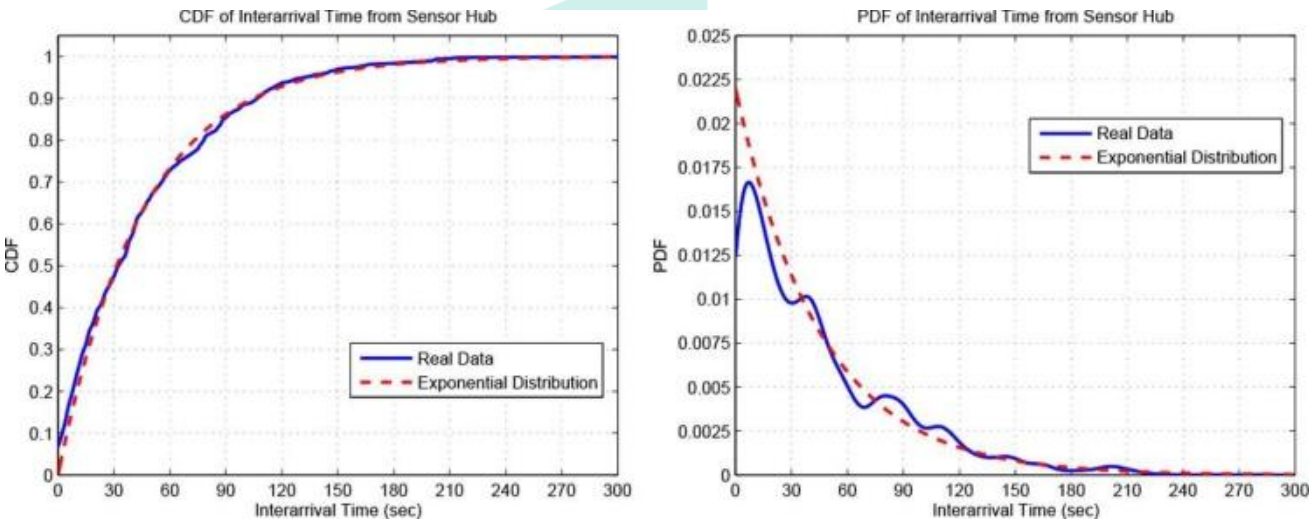
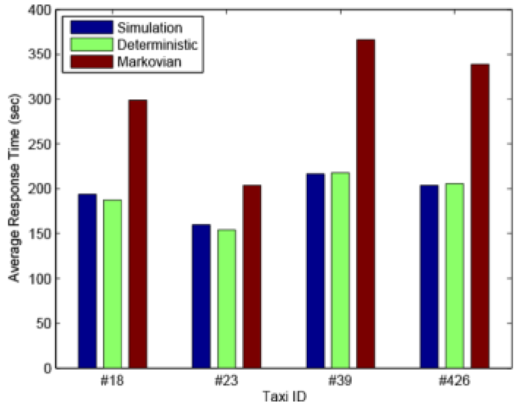


Fig. 5 Distribution of interracial times for aggregated arrivals (see online version for colors)

Experimental results for atomic services: We simulate an atomic service processing IOTS device requests. It is based on T-Drive data and the service times are produced at random using an exponential distribution with an average of 150 s. Sample pathways are constructed based on the queuing system's dynamics, and their output data is carefully evaluated to estimate system performance. There are some 'gaps' between some of the data. For cab #18 the GPS sensor transmits its position at 16:50:32, and the next data arrives at 19:58:45, almost 3 hours later. Although such a wide gap does not alter the queuing system dynamics, it does affect the model analysis since it affects the computation of the average 164 J. Huang et al. Figure 4 further shows that the gap population is minimal, and so has little influence on the system dynamics. So we don't include them in our parameter computations. To verify our technique, we compare the experimental findings to theoretical solutions. We undertake two theoretical sets of study, assuming deterministic and Poisson distributions for request arrivals. The deterministic arrival model should better match the simulation findings, while the Poisson arrival model should offer us with a worst-case answer.

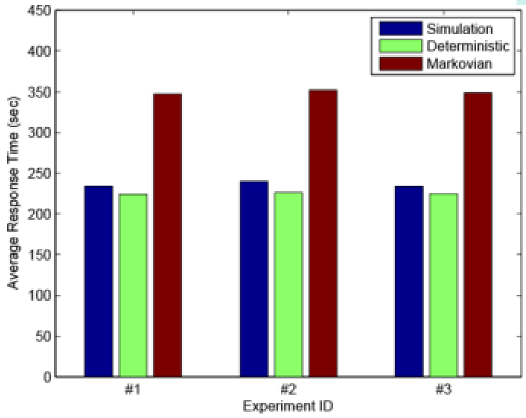


Taxi ID	Experimental Result	Deterministic Model	Markovian Model	Relative Error
#18	193.7868	187.6446	298.5885	3.17%
#23	159.5771	153.7986	203.6725	3.62%
#39	216.5673	217.7914	365.9622	0.57%
#426	203.5256	205.3785	338.7867	0.91%

Fig. 6 shows both the experimental results and the analytical solutions

On one side, the comparisons show that the relative error of our semi Markovian model under deterministic arrival assumption is around 4%, proving our approach's usefulness for performance assessment. Although certain arrival distributions (e.g. taxis #39 and #426) are not normally predictable, the inaccuracy may be limited. The system with Poisson arrivals has a reaction time that is almost 50% longer than the one with deterministic interracial time. Thus, our Markovian models' analytical findings may be useful for worst-case analysis, particularly in circumstances when inter-racial request durations are very variable.

Figure 5 shows the request arrivals for a service node with aggregated arrivals, which resembles a sensor hub in reality. To estimate overall performance, we must use deterministic and Poisson distributions as input to our model. Figure 7 displays the relative error rates of our approach's prediction outcomes. First, the Markovian model performs better than the deterministic model because the arrival distribution is more exponential than deterministic. Second, the Markovian model's performance prediction is acceptable up to a point, with a relative inaccuracy of 25%. Third, the mistake rate decreases with average service time. Longer service times imply more requests in the queue, proving the Markovian model's applicability for worst-case analysis.



Experiment ID	Experimental Result	Deterministic Model	Markovian Model	Relative Error
#1	233.8625	224.4584	347.4407	4.02%
#2	239.8189	226.5554	352.1432	5.53%
#3	233.6540	225.1433	349.0132	3.64%

Fig. 7 Empirical results of sensor hubs (see online version for colors)

Experimental results for IOTS systems: We simulate an IOTS service system with many atomic services to test our queuing network architecture. The system is considered to have four levels, with the service nodes arranged in a hierarchy as indicated in Figure 3. Each GPS sensor sends data to its own edge server, which may then route queries to its upper-layer nodes. Our model uses the T-Drive data set's sensing data arrivals as input. On one side, we test our analysis' correctness by using random T-Drive data groups.

Using the same task arrivals, we modify the model parameters to evaluate how they affect the overall system performance, and provide short comments on parameter improvement. Figure 9 shows the outcomes of these tests. These findings were obtained by fine-tuning service rates inside the edge (layer 2) and core cloud (4th) layers. It is proven that raising the service rate of the edge nodes (2) improves the average response time more than increasing the service rate of the edge nodes (4) does. With limited resources, upgrading edge services should be prioritized. The second image shows a task scheduling example. Layers get varying burden levels based on bypass probability. Because cloud services have a greater service rate, the average response time should decrease as bypass probabilities rise. The chart also shows that shifting requests from edge to cloud layers (i.e. raising b2 in our queuing model) improves performance compared to modifying workload assignment inside multilayer cloud servers. Because of this, resource management and job scheduling of service nodes at the edge layer are critical concerns in IOTS systems.

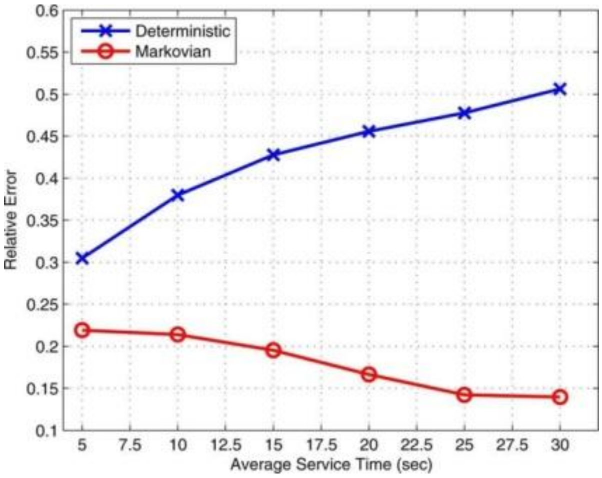


Fig. 8 Empirical results with different parameters in IOTS systems (see online version for colors)

QUANTITATIVE SECTION

In this section we have studied the role of leadership to attract digital investment using IOTSS, for identifying the variables of leadership which attracts digital investment, we highlighted theoretical foundation

Theoretical Foundation

Resource Based View Theory: W. Werner believed enhanced Penrose's 1959 Resource Based View Theory. The Resource Based View (RBV) idea states that organizations may outperform competitors by using unique resources and skills. The RBV stresses the firm's resources as the primary factors of success.

Resource-based thinking is rigid and does not explain how a single resource might produce long-term competitive advantage. Also, the idea of firm-specific resources is vague, making measuring items difficult to operationalize. A resource-based view does not highlight the link between resources and capabilities.

Dynamic Capability Theory: It was created by David Teeceetal (1997). Based on dynamic capabilities theory, firms may combine internal and external firm-specific competences to create new competencies that fit their tumultuous environment. To adapt to the rapidly changing external business environment, businesses must have dynamic capabilities. Dynamic capacity is the enterprise's ability to see opportunities and risks, make timely and market-driven choices, and modify its resource base. The idea seeks to comprehend how organizations employ dynamic capacities to adapt to and cause environmental changes. Like any other theory, dynamic capacities have been challenged for being difficult to assess experimentally (Zahra, Sapienza & Davidsson, 2006).

Conceptual Review

Business Process Re-Engineering (BPR): Breaking away from unproductive company practices and rethinking procedures is BPR. It tries to alter companies fundamentally and swiftly by revamping strategic processes, policies, organizational structures, values and supporting assumptions. To enable organizations to empower themselves with modern technology, business solutions and innovations, Akametal (2018) proposes that BPR implies altered processes. According to Naveerda (2014), BPR is a revolutionary method for bringing about radical transformation in an organization.

Orogbu et al. (2015) defined BPR as an endeavor to reorganize the organization for increased efficiency and effectiveness by concentrating on everyday activities rather than conventional business functions.

In order to accomplish quantum jumps in performance throughout a corporation, BPR requires an unrestricted reshaping of all business processes, technologies, systems, organizational structure, and values.

BPR designs workflows and business processes inside a company. A business process is a collection of actions completed to produce a set of business outcomes. BPR is the examination and redesign of corporate process. BPR is a way for introducing new processes and working styles. BPR adds new elements. Mwaura (2016) described BPR as rethinking and rebuilding business activities to better meet the organization's objective while reducing expenses. According to Kapoor (2011), BPR improves productivity, lowers time between activities, saves costs, and gives workers meaningful responsibility. Musa (2019) and Orogbu et al. (2015) defined BPR as rethinking, process function, and radical transformation. King Bade (2014) used solely organizational resources as BPR. Thus, organizational resources, creative thinking, and process function are considered in this research.

The three key factors of features of any CEO/Leaders are;

Effective use of Organizational Resources: This includes technical, human, and financial resources. Human resource includes the beliefs, attitudes, and habits of the individuals in the company, as well as the leadership that inspires them to reach their full potential. A firm's technical resource is its capacity to respond to and even anticipate its consumers' demands and wishes. According to Urban and Heydenrych (2015), a company's technical supremacy causes customers to choose its goods and services. Investment money from commercial banks and other financial institutions, or stock injection from existing sources are examples of financial resources. It refers to finances from commercial banks, retained earnings, and other sources of funding accessible to an organization. According to White, Maru, and Boit (2015), financial resources might be formal or informal.

Innovative Thinking: The objective of innovation is to create new items that meet market demands. By employing relevant process technologies to produce new goods, the research defines creative thinking.

Process Function: Process function comprises modifying tools, equipment, and operating procedures, and converting knowledge into expertise throughout the process. Process function is governed by prior knowledge investment, either internal or external, and entails selecting chances to exploit. Thus, each process involved in organizational operations has a role to perform.

Digital Investment using lots: Using lot to streamline essential business operations and offer users access to new apps or information gives you a competitive edge. You will be the preferred contractor in your field if you can finish a tunneling project faster and cheaper with an accurate, real-time lot monitoring technology that prevents mishaps. The consumer sees the value and dependability of you're providing, leading them to pick you above others.

Hypothesis of the Study:

H1: The feature of CEO/Leadership: Effective use of organizational resources has no substantial impact on digital investment using IOTSS.

H2: The feature of CEO/Leadership: innovative thinking has no substantial impact on digital investment using IOTSS.

H3: The feature of CEO/Leadership: Process function has no substantial impact on digital investment using IOTSS.

Methods: This study employed a survey research approach to generalize the sampled population's results. Because of time constraints and a lack of secondary data, we are altering different study hypotheses to explore the link between factors. Participant firms included Nestle S.A. and Cadbury. Cadbur has 2,187 full-time workers while Nestle SA has 550 (Firms' annual reports, 2018). This takes the study's total to 2737.

The sample size for the investigation was calculated using the Taro Y amine formula;

$$n = \frac{N}{1 + N(e)^2}$$

$where\ as\ n = sample\ size$

N=Population of study

E=Significance error

$$n = \frac{2737}{1 + 2737(0.05)^2}$$

n= 350

Because the population of the sampled firms was stratified, the following formula was used to proportionally determine the sample size of each firm.

$$Cn = \frac{n}{N} Xn$$

where CN denotes the anticipated participant unit per reputable university, CN denotes the demographic per chosen firm, N denotes the study's overall population, and N denotes the study's sample group.

$For\ Nestle =$

$$Cn = \frac{2187}{2737}\ X\ 350 = 280$$

$For\ Cadbury =$

$$Cn = \frac{550}{2737}\ X\ 350 = 70$$

Results: Cronbach Alpha was used as a test instrument to determine the rate of internal consistency in the data

Table 1

Reliability Results for the Variables

	Cronbach Alpha	**Items**
Effective use of Organization Resources:	.729	3

1. There is adequate technology infra-structure and they are used to achieve organizational objectives
2. My organization facilities are maintained from time to time
3. Organization has adequate equipment and structures in Good condition to meet its mandate

Innovative Thinking:	.728	4

1. Everyone in my organization appreciates and promotes the use of dominant theories in our efforts.
2. Through information sharing, innovative conceptualizing increases employees' ability to accomplish jobs efficiently.
3. My company creates new items in response to public demand or demands.
4. The organization is constantly coming up with innovative production techniques and delivering services ideas.

	Cronbach Alpha	**Items**
Process Function:	**.728**	**3**

1. My organization has a system that is open to change in its methods of operation
2. My organization has been able to simplify its methods towards ensuring that results are achieved.
3. My organizational ways reinvented the way work is being

Do net omit the current business demand

Digital Investment using IOTSS:	**.731**	**3**

1. The knowledge management capability in my organization would be difficult and expensive for rivals to duplicate
2. My organization ensures frequent product development
3. My organization has gained more customer patronage in the market1

45

The Cronbach Alpha results for the variables with the selected items were displayed in Table 1. The reliability values for organizational resources, innovative thinking, process function, Digital Investment using IOTSS, and operational performance were found to be.729, .728, .731, and.722, respectively. The values are greater than 0.70, implying that the data are trustworthy in achieving the study's objectivity.

Table 2

Correlation Matrix: Business Process Re-Engineering Components and Digital Investment using IOTSS

	Competitive Advantage	Organizations' Resources	Innovative Thinking	Process Function
Digital Investment using IOTSS	1			
Effective use of Organizations' Resources	.081	1		
Innovative Thinking	.491	.237	1	
Process Function	.034	.-065	.085	1

Dependent Variable: Digital Investment using IOTSS Source: SPSS Output. 2019

The correlation matrix between the BPR components (effective use organizational resources, innovative thinking, process function, and Digital Investment using IOTSS) can be found in Table 3. BPR components appear to have a favorable link with Digital Investment using IOTSS. However, inventive thinking has the strongest link to Digital Investment using IOTSS. All of the associations are significant.

Regression Analysis (Hypothesis study): The components of business process reengineering (organizational resources; innovative thinking; and process function) have no substantial impact on a company's Digital Investment using IOTSS.

Table 3

Business Process Re-Engineering Components and Digital Investment using IOTSS

	β	**Std**	**t-value**	**P-value**
Effective use of Organizations' Resources	-.034	.045	-1.757	.049
Innovative Thinking	.526	.054	9.759	.000
Process Function	-.006	.026	-.219	.827
R^2=0.243				
P-value=0.000				
F-Value=32.776				

Dependent Variable: Digital Investment using IOTSS Source: SPSS Output. 2019

For Hypothesis 1, multiple regression findings reveal no notable influence on businesses' Digital Investment utilizing IOTSS from the components of BPR (organizational resources, creative thinking, and process function). In the context of business processor engineering, organizational resources, creative thinking, and process function all explain (R2=.243) the differences in digital investment made utilizing IOTSS. Firm Digital Investment was negatively affected by effective utilization of organizational resources (t = -1.757, P-value =.045), according to the data. Innovation has a positive and significant impact on Digital Investment using IOTSS, according to the data (=0.526, t = 9.759, p-value=.000). Process function also had a negative and modest impact on Digital Investment utilizing IOTSS, as the research indicated. An analysis of the total p-values in a multiple regression model showed that organizational method is intended components have a considerable influence on Digital Investment utilizing IOTSS of the chosen global firms. As a consequence, this research disproves the null hypothesis.

DISCUSSION

The study's methodology was unrestricted since it focused on BPR and organizational performance. Hypothesis one found that organizational resources had no effect on a company's competitive advantage. Others beyond a firm's resources may help obtain a competitive edge. Companies probably aren't using their resources to get a competitive edge.

Musa (2019) claims that firms suffer when they lack resources. However, the hypothesis' results contradicted those of Ismail et al (2012), Ongeti et al (2018), and Nganga, Waiganjo et al (2015). Multiple regressions also demonstrated that creative thinking leads to a firm's competitive advantage. Companies develop innovative goods or services as a consequence of creative thinking. Innovative thinking leads to innovation, which gives enterprises a competitive edge and boosts the global economy. Other research including Reguia (2014), Urbancová (2013), and Adhikari (2011) found similar results. A competitive advantage was not gained by the chosen enterprises' processes, based on the results of the hypothesis on process function. This means that the process of carrying out company ideas is linked. The results refute Orogbu et al (2015).

With regard to hypothesis two, the multiple regression analysis demonstrated that business process reengineering (organizational resources, creative thinking, and process function) positively impacts the chosen organization's operational performance in the worldwide industry. The operational operations of the chosen firms showed that business process re-engineering components are interconnected. Business process re-engineering has been proved to increase product quality, waste reduction, manufacturing speed, and service provision.

The hypothesis' findings are in line with those of Obalum et al (2018) Akingbade et al (2014).

IMPLICATION AND FUTURE RESEARCH DIRECTION

According to the previous study's analysis and interpretations, BPR components (organizational resources, creative thinking, and process function) are important in operational activities of international organizations. The research concludes that only new thinking may contribute to competitive advantage. As a consequence, the research found that integrating organizational resources, creative thinking, and process function increases global organizational performance.

In order to preserve a competitive edge and strong operational performance, companies should continue to employ or copy policies that encourage new ideas from all stakeholders.

The organization's process function should be further developed to improve operational efficiency and performance, as well as to acquire new resources and update current resources. This will help uncover any weaknesses that may impede the firm from attaining its short- and long-term goals.

This study will help managers globally, especially at Nestle SA. It will help them understand the importance of business process re-engineering. This study will help the government promote and establish institutions or regulations that make business processor-engineering techniques more accessible to manufacturing and other businesses. This study will help academic institutions with research and course curricula. Business process re-engineering and related topics will benefit from this study. The research will help the general public understand the value and need of business process re-engineering. The results might be used to improve small and medium-sized company operations globally.

CONCLUSION

During the 1980s, emotional shifts in the corporate environment forced organizations to evaluate old ways of work and promote new focused practices based on new plans of action. Many business board concepts developed, but BPR was perhaps the most influential. BPR originated as a new start, spiral approach. In any case, the first notions didn't contemplate issues like improvement of job techniques, hierarchical societies, and IT foundations that were substantially associated with associations. Experimentation failures have spawned a variety of BPR methodologies, equipment, and methods Thus, the concept of BPR has lasted and expanded to include multidimensional cycle change activities. Reengineering is a means to deal with analyzing and modifying the notion of organizations and corporations.

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