

# Cloud-IoT Implementations & Its Impact on Organizational Performance - A Quantitative Study on IT & Business Leaders

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## Abstract

In recent years we have seen tremendous growth in two key technologies like Cloud and IoT. Be that as it may, a few common points of interest getting from their integration have been recognized in the literature and are anticipated later on. From one perspective, IoT can profit by the boundless abilities and assets of the Cloud to repay its mechanical requirements (e.g., capacity, handling, vitality). In particular, the Cloud can offer a powerful answer for actualizing IoT service management and structure and additional applications that endeavor the things or the data created by them. Then again, the Cloud can profit by IoT by stretching out its extension to manage genuine things in a more disseminated and dynamic way, and for conveying new services in an expansive number of genuine situations. The integral attributes of Cloud and IoT emerging from the distinctive recommendations in literature and moving the Cloud IoT worldview are accounted for in this paper. The Cloud goes about as a middle layer between the things and the applications, where it conceals all the multifaceted nature and the functionalities important to actualize the last mentioned. This framework will affect future application advancement, where data social occasion, preparing, and transmission will create new difficulties to be tended to, likewise in a multi-cloud condition. In the accompanying, we condense the issues settled and the points of interest acquired while embracing the Cloud IoT worldview. Cutting edge technologies like Cloud & IoT has gained popularity in various businesses and there is great importance for organizations to understand the possible benefits which an organization can benefit by the adoption & implementation of new technologies like Cloud & IoT. This study focuses on a survey-based investigation of various businesses & IT leaders to identify the organizational performance post after the implementation of cloud & IoT. This study focuses on measuring key organizational performance metrics like profit, revenue, customer satisfaction, product delivery, product quality etc

**Keywords:** Cloud, IoT, CIO, SME

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## 1. Introduction

IoT and Cloud computing has transformed the business in recent years. Internet-of-Things & cloud can create profit for the organization by the adaptability, execution and pay-as-you-go nature of it. To be sure when IoT & its application usage increases it would create vast volumes

of data and involve different computational parts (e.g., data handling and investigation calculations) & their integration with cloud computing infrastructures would become a major factor for all the IT consumers or implementers.

A Small Medium Enterprise (SME) building up a vitality management IoT item, focusing on keen homes and shrewd structures. By spilling the data of the item (e.g.,



and the degree of this open passage is 'Goliath'. Take the occasion of a printing firm. In the printing plant, machine-based sensors can keep the producer taught of whether there are any lacks along the line, engaging them to settle blames as or even before they occur. They may in like way utilize sensors in a mechanical age framework to collect data about each development in the creation system, and after that dissect the data to redesign efficiencies and lessening bubbles. In any case, imagine a circumstance in which sensors are also set in the printer units. The data gave by these incalculable would give an enormous operational and execution record of the printers. This data would engage the maker to complete three things.

Promptly, it can constantly improve its things at the planning stage to guarantee routinely point by point deficiencies are removed. Likewise, it could utilize the data to imagine where and when issues may occur, engaging them to offer a subordinate accomplice association to their clients [Beale, 2011]. IoT connected with remote observing and bolster enables organizations to perseveringly pass on data from related things and particular purposes of enthusiasm for cash following and making frameworks.

As expressed, organizations can offer to propel association contracts to screen and resolve issues. For clients without such contracts, organizations can offer exceptionally named repair benefits through which they can make new leads for the thing/advantage substitution or update. For each association with a client without an association contract, effective or fizzled deals, attempts can be sustained once more into the business' suggestions motor to expand dynamic help and invigorate its business approach, guaranteeing things and game plans battle better ring with clients' needs [Dobre, 2014].

### 2.3 Product Delivery

What do oil pipelines, mechanical office floors, computerized stockrooms, shipping compartments, and sustenance disseminating focuses have in like way? They're all crucial parts in supply chains and they're all confronting a key change by the prudence of the Internet of Things. The Internet of Things, or IoT, has changed into an intense issue over the business world, somewhat in the context of the sheer number of "things" being connected over the Internet. These contraptions, be they cars, mechanical robots, pieces of clothing washers, lifts, or home indoor controllers, are being equipped with sensors and frameworks that draw in them to make high volumes of data and transmit it over the Internet.

On the not as much as the appealing end, organizations are amassing and investigating that data to train a course of action regarding business choices and endeavors. Stores sort out circumstances, and the frameworks that

explore them will be among the best recipients of cloud-controlled IoT designs [Hossain, 2013]. Sensors, controllers, and other IoT related contraptions will pester everything from specific things to compartments and transportation holders. They will be presented all through amassing plants and stockrooms and will help track maritime powers of vessels, trucks, and particular vehicles.

All things considered, these changing and interconnected segments will give administrators predictable, end-to-end perceptible quality and authority over their supply chains and thing transport. Layer on data-driven computerization, huge data examination, wherever/at whatever point cloud-based organizations and other basic advances, and store orchestrate outlines are set to bend up fundamentally more earth-shattering, evident and cost-productive. Getting by the capacity of the IoT requires careful sorting out and consolidates dealing with a gathering of difficulties.

Notwithstanding, a different relationship in the degree of industry divisions are by and by tolerating prizes from IoT-empowered supply chains [Hassan, 2013]. Given the present pace of innovative change, and the stimulus to utilize moved advances to switch created plans of action and assignments, affiliations need to move right currently to begin modernizing their supply chains with IoT-driven strategies. Different sorts of supply chains may see more obvious or lesser profitability gets, yet IoT-connected with strategies should drive gigantic changes in thing transport, profitability, reasonability, and other key execution markers paying little respect to the store-mastermind class.

In the Forbes insights survey, 64% of regulators said that the general association of the store arrange was a prerequisite for their association. For organizations with sprawling coordination errands, this shows up to a great degree clear. Amazon, for instance, has encountered quick headway in recent years. It beginning at now oversees more than 500 million stock keeping units (SKUs) (up from 400 million prior this year) and works more than satisfaction focuses, centers, and assorted zones the world over, some of which are more than 1 million square feet in the district. Amazon workers used to stroll around these 'goliath' satisfaction focuses, checking, and picking things [Prakash, 2015]. In any case, in 2012, Amazon procured Kiva Systems, which makes IoT-connected with robots that are eventually used to mechanize that approach. By redesigning scattering center profitability; these robots have cut working costs by 20%, sparing an ordinary \$22 million dependably in each. On the off chance that the Kiva robots were exhibited all around, at all of Amazon's evaluated scattering focuses, it could spare the affiliation more than \$5 billion reliably while in like way guaranteeing that thing transport is lovely.

## 2.4 Product Quality

Brian Buntz rapidly records cases of organizations that are executing or benefitting from IoT limits. Every depiction shows how IoT is reshaping or renaming industry hones. One case staggeringly persuading is Proactive Quality Assurance, empowered by a course of action of distinguishing and evaluating gadgets in key zones all through the store framework and age process. IoT sensors amass mean thing data and other distant syndicated data from different times of a thing cycle. This data identifies with the strategy of grungy materials utilized, temperature and workplace, abuses, the effect of transportation, and so on the last things. Likewise, whenever utilized as a bit of the exact opposite thing, the IoT gadget can give data about the customer ends on utilizing the thing. These wellsprings of data can later be eviscerated to perceive and fix quality issues. With IoT, the capacity to screen and examine process and thing quality at central fixations in the store framework and age shapes, and perceive when sub-standard materials are presented or thing traits get derailed purposes of intrigue guarantees basic expense decreases [Marusic,2013].

Consider circumstances where redesigned checking of arrangements, fabricating outlines, and even things being utilized by customers can add to an enhanced thing and process quality. Regardless, IBM has for quite a while being an expert on a proactive quality association, building up the Quality Early Warning System (QEWS) estimations for prior, more conclusive affirmation of issues each through it have creation arrange. The QEWS calculations have been joined into the IBM Prescriptive Quality on Cloud offering to engage makers to see issues in provider materials and advancement strategies.

## 2.5 Customer satisfaction

A productive cloud and IoT usage enable organizations to trick the greater part of their inventive movement, consequently updating the adequacy of their clients who utilize the framework. Through altering slim unquestionable verification and quality controls, organizations can spare this abundance of time and exertion and possess it towards different zones of their business assignments by actualizing cloud and IoT. One unexpected favored viewpoint of cloud and IoT utilization is buyer commitment. While your organization is utilizing cloud and IoT react in a due request in regards to updating all zones of its business shapes, these developments will, over the long haul, affect the customers. Transport times can be all the more precisely anticipated, adjacent to the responsiveness of the customers while planning with the customers [Wamba, 2017]. If your association's customers are furnished with a solid and beneficial snippet of data, they will hand-off this sureness to their customers. This, along these lines, broadens purchaser commitment.

With the assistance of Oracle Service Cloud, Elsevier copied the number of customers discovering answers through its help center concentrations around 52%, while the measure of demand achieving the contact focus decreased by 28%. General purchaser resolute nature stretched out to 91%. Cloud move or its show spending moving from standard IT contributions to cloud organizations will affect more than \$1 trillion in IT spending by 2020, as per Gartner. Two application portions that will feel cloud move the most are business process-as-a-service (BPaaS) and software-as-a-service (SaaS), with a 43% and 37% particular cloud move rate. One of the essential suppliers of BPaaS and SaaS-based IT advantage association answers for endeavors, BMC Software, has utilized cloud move and more indisputable interconnection to change the vehicle/exchange of its Digital Enterprise Management software answers for BMC representatives and customers with fundamentally enhanced shopper reliability, diminished downtime and lower costs.

A victor among the most broadly legitimate indications of the IoT is in its capacity to engage relationships to enhance the customer encounter/satisfaction. In Forbes Insights consider, 90% of officials said that a potential change to customer/buyer satisfaction was a victor among the most fundamental open passages for the IoT. While this shows up extraordinarily clear in the customer space, the IoT can correspondingly essentially impact how customers acquire and gobble up present-day equip [Stephen, 2012]. Every last one of these cases displays that IoT can engage any relationship to push its business. Despite whether it's through creative movement, a streamlined stock framework, better resource following, and association, updated financial key expert, or an unrivaled customer encounter, the IoT can and will proceed to, enhance the fundamental stress for a relationship in generally every vertical.

## 3. Research Design

As part of this study, a survey was conducted using online methods. The survey attempted to explore the various factors involved in cloud-IoT implementations and the impact it on key organizational performance metrics like Profit, Revenue, Product Delivery, Product Delivery, Customer satisfaction, etc. This study was conducted on IT and business leaders/professionals from various countries across the globe. A sample size of 405 was used for this survey. Since the target population is unknown the baseline was of 385 has to be maintained. The sample size of 405 was used to have an effective result after excluding the errors.

Since this study was conducted on senior IT & business leaders an online viva was used for the data collection purpose. A website named e-mailmeform.com was used to create an online survey. It is a paid services based portal that provides survey setup services. This has

security features like one response from one computer and one response from one IP address. These sorts of security features would help to avoid duplicate submissions resulting in improved quality responses. A total of 40 questions were asked to the respondents and the results were captured and correlated using the IBM SPSS statistical tool.

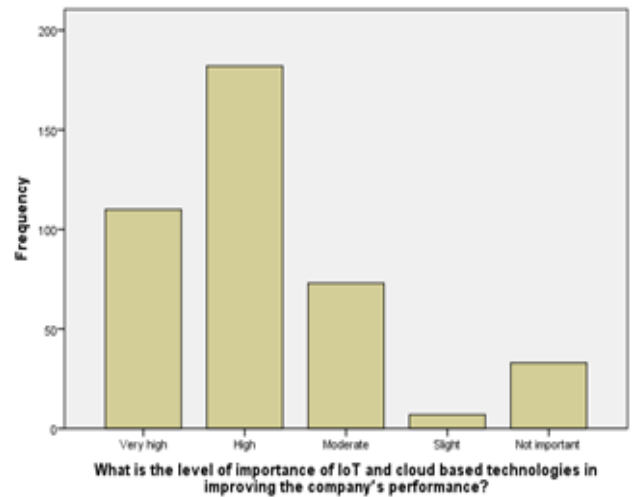
#### 4. Survey Results & Discussions

Total number of participants were 405 about 346 male and 59 female respondents were surveyed to explore the change in the CIO role and the resulting organizational performance post after the implementation of cloud & IoT. As showed in the data computed above, exactly 228 respondents out of the total number of people who responded, which is 405 in number, strongly agreed with the fact answering the question that the successful implementation of IoT and cloud computing based technologies will have a bearing on the overall performance of the organization.

Following this wise, a whopping number of 120 respondents, representing 29.6 percent of the total respondents also did agree though not strongly with the fact stated above. Meanwhile, very few respondents, about five in number and accounting for 1.2 percent of the total respondents, disagreed with that. Only two of these respondents who disagreed, strongly expressed their own disagreement while about fifty of the remainder participants went neutral and indeterminate on the matter stating that it is both possible and impossible at the same time.

	Frequency	Percent	Valid Percent	Cumulative Percent
Very high	110	27.2	27.2	27.2
High	182	44.9	44.9	72.1
Moderate	73	18.0	18.0	90.1
Slight	7	1.7	1.7	91.9
Not important	33	8.1	8.1	100.0
Total	405	100.0	100.0	

**Figure 1.** What is the level of importance of IoT and cloud based technologies in improving the company's performance



**Figure 2.**

In agreement with the data computed in Fig. 1 and 2, the total number of respondents who made known their opinion on the question stating “*What is the level of importance of IoT and cloud based technologies in improving the company's performance?*” was 372. About 110 of these respondents accounting for 27.2 percent of the total respondents strongly agreed with the question that CIOs have a high level of importance, while about 182 respondents taking up 44.9 percent of the total respondents did agree with the suggestion though not very strongly. However, about seven of the remaining respondents think that CIOs on have a slight level of importance and only thirty-three persons of these respondents strongly disagreed emphasizing on their non-relevance in organizations. Moreover, there are few respondents who gave a moderate view to the stated suggestion above, and they are 73 in number, accounting for the remaining 18.0 percent of the total respondents.

#### 4.1 Profit

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	74	18.3	18.3	18.3
Agree	182	44.9	44.9	63.2
Neutral	134	33.1	33.1	96.3
Disagree	13	3.2	3.2	99.5
Strongly Disagree	2	.5	.5	100.0
Total	405	100.0	100.0	

**Figure 3.** The Company is making higher profits after implementation of cloud and IoT based technologies



























