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International Business Challenges Faced by EXIM Companies

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Abstract—International business concept is no longer but in reality, it is practical firms which has large and small face. In 21st century a firms who want to survive have to tackle in all inclusive force which penetrate every business aspects. In international markets a broad extent of manufacture from Automobiles, Healthcare to Food and Textiles firm are facing pressure of global struggle. There is no longer alternative to determine, not to impart in the international market. In spite of their size, All firms, have to skill scheme in the broader theory of world markets to expect, answer and get used to the dynamic boundary of these markets.

As domestic country marketing is easy to do, but international marketing is not easy do. Company has to face many problems in International marketing when they go across the boarder.

Compare of national market in international market there are bunch of dynamics challenges which they has to face. In New region there are many issued have to face in market due to variety of culture and political reality in different countries, which create abundance of hindrance for a company in the international market. In Domestic market company faces small number of problems bu when company entered in global market then they have to face number of problem which we are going to discuss in our paper.As the firm enlarge in global, it will need to move away from country-centered strategies and improve collection and skillfulness across national markets, investing its ability and skills to acquire in marketing they have to face a leadership position. This paper will explain how the Export and import companies face challenge in doing global business.

Keywords: International Business, Global marketing challenges, Geopolitical trade variations.

INTRODUCTION

In different regions of the world a company who is doing business in many countries is a international company. A company who sells goods and services in various

countries but manufacture in his own country. In 2000 globalization has become general trade in mainstream. GDP of Goods and services reached on 25% world wide of if international trade. [Govindarajan, V. & Gupta, A. 2000], Since 1955 100 times international trade has multiple in the term of goods and services. [Schiffers, S. 2007]. For international presence number of important challenges increase in globalization. To assure at a world wide level many of planned characteristic necessity assumed into account level. and afterwards. At local, regional and international levels to altering patter stable elasticity is essential to become customary.

By a handful of nations financial system is no longer forbidden in the universal. The intercontinental marketplace. A mercantilism and its position need to understand the convoluted workings. Company which is rising that is only one export & import which has been connected in the world more progressively. Approximately from any where in the world it has become easy to purchase product in the world. Urgent trade goods are always Food and big technologies. now every things are available, it may be a big company or a small or a normal person who is acting behind the screen. To shipping goods across the world export and import companies are coming up with change of integrity ways, for a deliver customer don't wants to wait for a week. However export & import companies are still facing heavy financial challenges. many of traders are gone wrong and many of trades are doing local and international business. Export import companies will be in big lose if trade fiance will not managed correctly. There is a lot to consider and to understand that we are doing business with multiple countries.

OBJECTIVE

The purpose of this study is to understand the challenges faced by the export import firms at the time of international trading Post GST in India. In addition, the challenges faced by importing companies in Italy are also taking shape.

RESEARCH METHODOLOGY

Through survey Data has been collected through the primary and secondary based. In order to achieve the objectives of the study, primary data is collected through a questionnaire. A pilot study was conducted with 20 questions drawn with the help of Sampling Method to specifically cover the challenges of EXIM firms. One exporter and One importer from four sectors (HealthCare, Textile, Metals and Food) are picked for better generalization of challenges. The same research was also conducted in Italy using the same parameters.

LITERATURE REVIEW

Due to climate change, rise of worldwide terrorism, social inequalities, food shortage, material and spiritual poverty. The world is facing lot of crises. Many of the issues has been modified by the world but others are not agree to be part of statement.

In the international market need to understand about the product , labour, capital ,knowledge because it is strength of the market which need to understand by the human for the continuation for current and future Eco systems.

These changes are determined by the growing inter contentedness of financial systems, worldwide trade, increased labor mobility, in sequence and interactions technology, and foreign direct investment.

Some scholars argue that we have enthused further than the age of globalization toward an age of globalist. In such an age, personality actions, local business practices and national politics all have global impact; it therefore matters on more than one stage how we think about business in a global group of people. In this figure, we wish to make accessible space to global perspectives on how we can reorder and shuffle global business and decision-making practice to be a part of the explanation to our global troubles. More highly we hope that this assistance make available impulsion for further research, practice and pedagogy development. [Lupton, Nathaniel & Pirson, Michael; 2014]

CHALLENGES FACED BY EXPORT & IMPORT COMPANIES

There are many risks and challenges implicated in EXIM business. Different types of risks involved are:

FINANCIAL RISK AND LOANS

Export Import companies are significantly affected by financial crisis. The nature of this business is to do constant and instant business but most of the time they

didn't get there supply on time, and when it gets trapped at customs, they finish up with cash deficiencies. If they want to get money form bank immediately no bank give loan there where lot of process to get money from bank. The procedure takes far too long. Moreover, it's more complicated and next to impossible task for small to medium enterprises (SMEs) to get bank loans. This risk refers to risk of high demurrages levy, late payment, shipment abandonment and failure to pay or fraud by foreign buyers.

Fraud by foreign buyers specifically in Textile industry which deals majorly on 100% payment at the time of delivery is hard to prevent for an exporter as most of the time they are unaware of buyer's credit merit and standing dues to other firms or Financial Institutions. Thus, it is necessary for the exporters to collect reports from abroad credit agencies about the financial potency and business status of buyer's. Collections of expenses using the methods that are accessible (open-account, prepayment, consignment, documentary collection and letter of credit) are not only more lengthy than for domestic sales, but also more complex. Thus, companies must carefully weigh the financial risk concerned in doing international dealings.

POOR QUALITY RISK

This is the risk of negative response of whole shipment after the entrance at importer's location due to poor quality of exported goods. So, Importers should make vendors to send mandatory quality check observation reports to the Importer before exporting the same. Sometimes importers may ask a pre-shipment examination that will be conducted by a independent inspection company or it may be indicative by the exporter to the importer during the cooperation stage that such an inspection be accepted out as part of the agreement. Such an examination protects both the importer and the exporter. The costs for the scrutiny should be settled mutually by the importer and exporter or it may be negotiated to be integrated in the contract price.

TRANSPORTATION RISKS & LOGISTIC RISK

This is the threat of transferring goods from one country to another. While transporting, there is the risk of theft and damage of the goods. As per Annual Report of FedEx 7% shipments annually are not delivered to consignee because of damage of products. It is advisable to EXIM Companies to have Product Insurance to avoid unnecessary losses. Logistics Firms like UPS, FedEx, DHL, DB Schinker provide in-house product insurance on shipment to shipment basis by applying some extra charges.

In Food Industry specifically products with short expiry dates risk is very high because in most of the countries Quality Assurance and Other Administering agencies give clearance only to those commodities having shelf life more than 66% [ICEGATE INDIA, DGFT Portal]. Eatables like dairy items or assorted vegetables having shelf life of 90-120 days are not feasible to ship by sea.

LEGAL RISKS & POLITICAL RISK

This risk arises due to changes in laws and regulations of nation. The changes commonly are different from country to country. So, it is crucial for the exporter to drafts a contract in combination with a legal firm, in this manner ensuring that the exporter's benefits are taken care of. Exporter must be clear about the law and dispute-settlement process that will apply to the contract. Huge care must be taken in assessing the lawful aspects of trade with a particular country. Thus, exporters must be determinedly alert of the policies of foreign governments in order that they can change their strategy accordingly and take the steps to avert loss of business and asset.

UNFORESEEN RISKS

Unpredicted risks arise due to surprising incidence in a country like a radical attack. This may totally wipe out market or goods of a company. So, it is very important for the exporters to make certain a force majeure part to be incorporated in any international contract. This also involves the risk of a country ceasing or restricting right of entry of meticulous goods into their market. This limit is place by the use of embargos, tariffs and quotas. It's may be due to political reasons. For example Indian Government every year bans the import of dairy products from China so there is lot of Unforeseen Risks with Dairy Importers who deal with Vendors from China.

EXCHANGE RATE RISKS

The opportunity of exchange rate group is referred to as 'exchange risk'. The exporter must move toward the Foreign Exchange division of his bank prior to quoting any prices internationally. Prevarication scheme is a policy that the exporter could pursue in order to defend against the pressure of exchange rate movements.

In their financial formulation export and import companies wants to make and take delivery of endless overseas payments, exchange rates are highly significant. Unfortunately, their is instability in exchange and also some little change of variable can a big disparity.

There where majors losses of amount on way in a big corporation, when they trade in millions. Every one has fear of government and taxes Policies. But export & Import companies have to faced big challenges.

They're dealing with the boundaries of trade agreements and if events are not carefully handled, they can end up in hot water.

This means that you can import or export the same amount of units in successive months, but get paid extensively different prices for them. When you're relying on a certain income for the persistence of your business, these unanticipated swings can cripple you. You might be left in the lurch, not capable to pay suppliers or meet your other expenses.

But the challenges caused by foreign exchange don't stop there. The implementation itself of money transfers can be slow, costly, and can break down.

- a) You require setting up a collections scheme. This is particularly applicable when it comes to import finance. If the receiver does not pay you on time, you could be left flailing.
- b) Payment processing itself sets it up for a lot of trouble. It require to process payments in harmony with the laws of more than one country. It needs to use competent systems that are suited to overseas payments like wire transfers however bank charges are very high in Wire Transfers but it's the safest and completely legal way of transactions. To increase the profits EXIM firms with lot of monthly wire transaction may ask their bank to provide special international account in which Wire Transaction fees is almost negligible.

CLEARANCE PROCEDURES AND TAXES

Each person dreads system of government and taxes. But import/export companies face the major challenges. They're trading within the boundaries of trade agreements and if proceedings are not carefully handled, they can end up in hot water. Tax is a complicated subject, seeing as different tax laws apply to different locations. In the end, you end up with ample of documentation, along with linked costs and sometimes shipment falls under wrong category and there is huge threat of Shipment Abandonment. Best practice for Import Company is to first identify the correct HSN Code of their product then check if any Restrictions applied by DGFT and then Basic Custom Duty and other taxes applicable on product and clearance requirements from Scientific Institutions of respective Categories on ICEGATE Portal. There are several Inorganic Compounds are of both Industrial and

Pharmaceutical Use small negligence may lead to tagging under wrong department and may attract avoidable Duties and examinations.

IMPACT OF GST ON IMPORT AND EXPORT OF INDIA

Indian economy is fastest growing large economy in the world. The fiscal deficit is the basic piece of equipment to assess a country's economic appearance and it refers to the balance between import and export as no country is fully independent. These factors together with the balance of compensation and trading (import and export) make a decision of the economic providence of a nation. The Goods and Service Tax come into play in India on 1st July 2017. As we already know GST has changed the available business configuration in India, it has also changed the import-export situation in the country.

Currently, GST is making changes in export and import in India by withdrawing wide multiplicity of formerly levied indirect taxes and it have an effect on the Foreign Trade Policy (FTP) of the nation.

The GST treats the import and export of goods as throughway trade under integrated Goods and Service Tax (IGST). Thus, all the IGST supplies are suitable in any kind of good and service supply relating to import and export.

IMPORT: ITC AND TAX STRUCTURE

The import of goods and services came under IGST now with the roll out of GST on 1st July 2017. Though, import has both IGST and Basic Customs Duty in present. The examiner, manufacturers, and traders of goods as well as services can balance their paid IGST against their output accountability i.e., Input Tax Credit. But they cannot take pleasure in any credit for Basic Customs Duty (BCD) and 10% Surcharge under the present GST structure. Citing an example here will be easy to understand this formula. If a company called 'A (Health Care)' imports goods worth of USD 3,000 from USA of HSN Code 3004, 30% basic customs duty is applicable on these imported goods and 10% Surcharge on BCD and 12% IGST.

So Total Charges will be calculated like this:-

Assessable Value in INR (Conversion Rate 71.26):
 $3000 * 71.26 = \text{Rs. } 2,13,780$

Insurance (1.19% of Value): Rs. 2,543.98

Transport Charges (20% of Value or Actual whichever is lower): Rs. 13,876

Total Assessable Value of Goods = Rs. 2,30,199.98

Basic Custom Duty (30%): Rs 69,059.99

Surcharge (10% on BCD): Rs. 6,905.9

IGST (12%): Rs. 44,198.27

So After paying Logistics Charges, Insurance, Duties & Taxes the value of Goods will be Rs. 3,50,364.14

EXPORT: ITC AND TAX STRUCTURE

As per the position of supply rules of the new tax command, 0% GST is charged in any export of goods and services from India. After paying the amount on input and input services, they can pertain for the refund as per the 38th section of Central GST Act, 2016.

The end game IGST covers the import and export sectors in India while export is GST free and import welcomes Basic Customs Duty and Surcharge along with IGST rate. As per the Federation of Indian Export Organization (FIEO), the exporters may face liquidity troubles as the domestic companies

May fall around 2% in the market. The commercial exporters may bear from higher observance costs. People can enjoy the fruit of GST in a long run; an early hiccup like liquidity crisis in export is normal as the absolute system is changing under the new tax regime.

FINDING

There has always been dilemma related to Indian EXIM, Some of them I mention here:

1. The high boundaries put up by Indian government. Not only Indian government but also the country you are doing to trade with. The problem is with the numbers of licenses and permissions to be taken before trading.
2. Indian trade policies are not in the same pace with International trade policies. In fact traders consider India a complex market with complexities like paying high taxes, cross-border trading, etc.
3. Another big reason is lack of good infrastructure facilities, both at airports and seaports for storing goods. Also export promotion is very low in India. So Indian government have big challenge in front of them to make export smoother in India.

COST IMPACT ON THE IMPORT AND EXPORT OF ITALY WITH NON-EU COUNTRIES

The Italian economy, after the great crisis caused by the pandemic, began a rapid recovery in 2021 and the prospects for 2022 are very encouraging. The fiscal deficit is the basic equipment for assessing the economic aspect of a country and refers to the balance between import and export since no country is completely independent.

These factors, together with the balance between clearing and trade (import and export), determine the economic providence of a Nation. The tax on goods and services has been changed and is called TARIC (Integrated Community Tariff). The TARIC has been in force since 1 January 2022 and provides for over 760 changes between new codes and existing tariff items subject to changes. This is the main impact of the EU Implementing Regulation no. 2021/1832. The updated NC Combined Nomenclature, which must be used by operators to declare goods to customs for import and export, incorporates the amendments to the Harmonized System SA 2022, a common basis for the customs classification of goods adopted internationally. The new tariff adapts to the technological evolution of goods, as in the case of industrial robots, electronic products and consumer technological objects, but it is also a “green” tariff, which monitors trade in environmentally sensitive products, such as electrical and electronic scrap, fluorinated greenhouse gases, in terms of emissions of tons of CO₂, and is attentive to people’s health, as in the case of the reclassification of new tobacco products based on the emissions they produce. This is a real general reorganization of the common language of international trade that is the basis of the application of the European Union customs tariff 2022.

IMPORT: TARIC AND TAX STRUCTURE

The import of goods and services is now subject to TARIC with the introduction from 01.01.2022. The customs duty varies according to the type of goods imported and is calculated on the basis of its value contained in the seller’s declaration which usually corresponds to the invoice sent with the product.

If a check is carried out and the Customs employee detects a mismatch between the amount paid and the value of the goods, this will be re-evaluated and the duty will be calculated on the new evaluation. This procedure is at the discretion of the customs officer, it is based on presumed evaluations and the choice of packages that are opened to verify the contents is done randomly. In any case, the tax is calculated on the value of the goods including shipping costs and if these are not indicated, an assumed value is also indicated in this case. In shipments to the European Union, the duty corresponds to the Integrated Community Tariff (TARIC) which is calculated as a percentage according to the product tables introduced by Reg. (EEC) no. 2658/87 to the first customs of entry into the Union. The amount of the duty (TARIC) is available on the website of the Customs Agency in Italy.

By citing an example here it will be easy to understand this formula. If a company called “A (cereals)” imports

goods worth € 10,000 from the Russian Federation with code 1008, a basic customs duty of 15% plus VAT of 22% is applied to these imported goods. Then the total charges will be calculated like this: -

Insurance (0.90% of the value): € 90

Transportation costs (20% of the value or actual whichever is less): € 2,000

Total evaluable value of the goods = € 2,090

Basic customs duty (15%): € 1,500

Supplement (22% VAT on € 3,590): € 789.80

So, after paying the logistics, insurance, duties and taxes, the value of the goods will be € 14,379.80

EXPORT: ITC AND TAX STRUCTURE

From a customs point of view, the EU legislation in force does not provide for the payment of duties or customs duties and VAT for export operations to third countries. Obviously, in the country of destination at the time of importation, the rules laid down by the country itself will be applied in this regard. In the event that, for these shipments, the service provided by international couriers or the Post Office is used, it will be necessary to fill in the relative packing slip.

FINDING

The other side of the coin, however, sees a number of weaknesses that characterize SMEs; first of all the fact that their success is so closely linked to the figure of the entrepreneur, this can lead to poor staff training and limit career opportunities in the workplace, which is why qualified professionals are often not attracted to ‘go to work in an SME. The traditional problem of SMEs is that relating to the difficulties in finding financial resources, given their often limited ability to offer guarantees to credit institutions, they are more reluctant to invest in projects despite the fact that the business growth opportunities are interesting. Another characteristic limitation of SMEs is that linked to the focus on production, which leads to the neglect of important business aspects such as organizational, logistical, control and marketing ones. Especially low marketing investments lead SMEs to have a rather weak brand and brand strength.

A series of weaknesses of exporting small and medium-sized enterprises are listed:

1. low managerial mentality
2. dependence on the entrepreneur
4. poor career opportunities
5. limited financial resources

6. little investment in marketing
7. organizational deficiencies
8. resistance to change

CONCLUSION

International industry is a great industry to get into but, like all businesses, there are most important challenges to deal with after understanding common challenges faced by several EXIM Companies. I would like to conclude that at the time of custom clearance human interference should be eliminated to avoid unnecessary delay and corruption. EXIM companies should create MOU with logistic Partner to enable half yearly spot rates to avoid over expenses due fluctuation of fuel surcharge.

National banks like IDBI should allocated fast track loan allocation processor of customer having IEC code. DGFT (Directorate General Of Foreign Trade) should integrate all EXIM notification with ICEGATE portal, So that all EXIM companies are aware of government policies.

Furthermore, international trade has suffered from the serious crisis recorded by the pandemic, where international trade has suffered a sharp reduction. Currently, in addition to the pandemic, we have 2 new phenomena affecting international trade: the energy crisis and the Russia-Ukraine war. These two events

with their consequences that will manifest themselves very deeply in the coming months, will create great logistical and economic difficulties. If international trade stops, it means that economies and local trade also stop. Therefore, a strong intervention by the World Trade Organization (WTO) is desirable to take measures to revive international trade.

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Communities Strengthening Peace and Harmony: A Technological Perspective

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Abstract—Mega technologies have completely revolutionized the way we interact with the world today. It has paved the way for opportunities and cooperation in almost every field. Technology is one of the most powerful factors to drive and build Peace in the world. In this data age, technology could also have adverse effects. Social media can spread misleading information and result in hatred and violence. Technologies such as Virtual and augmented reality can provide immersive peace education, artificial intelligence, semantic analysis, and digitalization can improve sustainability, governance and maintain security. This paper provides detailed insight on how in the present scenario, technologies are utilized and provided services to harness the peace. Also, this paper aims to provide suggestions to the policymaker and peacebuilder on the possibilities of inclusion of mega technologies in future and the suggestive projects to invest in for building peace and harmony.

Keywords: Mega Technology, Peacetech, artificial intelligence, Virtual and Augmented Reality

1. INTRODUCTION

Communities should strive to achieve peace in order to increase the wealth and prosperity of society. In social and commercial ecosystems that depend on communication and collaboration, peace is a source for businesses, governments, and cities that use technology to create value. The purpose is to clarify how technology aids in identifying a route to foster lasting peace by encouraging communities to produce value within digital, social, and commercial ecosystems (Nedelea & Nedelea, 2018). As a source of progress and development, technology encourages communities to pursue lasting peace and supports peacebuilding.

Technology has a pretty broad definition by itself. Everything falls under the category of technology development for global peace, from the wheel to the most recent satellite deployed. It has the potential to completely transform the planet and make it a nice place to live. By

integrating us on a national and worldwide level, it has in some ways made our lives more pleasant and convenient. Our lives have gotten so complicated in the modern world that we need its assistance to maintain harmony. It is widely used in promoting peace throughout the world (*View of Role of Technology in Promoting Peace*, n.d.). Therefore, it is the responsibility of each and every citizen of the country to use it in the greatest manner possible for the advancement of humanity. Even if we cannot ignore the numerous negative effects of technology, we can nonetheless work to limit these effects and make the best use of it to advance peace.

There are numerous ways to promote this peace, including through theatre, other performing arts, campaigns, sports, and education. Aside from this, we cannot discount technology's contribution to world peace. Technology is the body of methods, procedures, skills, and techniques employed in the creation of commodities and services. Technology includes everything from a basic wheel to the most recent satellite to be deployed. As a tool, information and communication technology enables global communication. As a result, it helps us in our efforts to advance peace. From climate change to public health, from food security to sanitation, from disarmament to disaster management, etc., technology has enormous potential to promote peace (Kahl & Larrauri, 2013).

How and when we hear about events and decide how to react to them are changing as a result of new technologies. The internet and mobile devices have changed how we interact with the outside world. In the developing world, technology use is growing quickly, opening up new opportunities for involvement, engagement, and responsibility. More people around the world now have the chance to actively participate and use these tools to influence processes that have an impact on their society.

2. PEACEBUILDING DIGITAL NETWORK

This section presents some of the most successful and crucial digital network which helps and contributes to

developing peace across the globe (*Tech for peace: Facts and figures*, n.d.). Some of the details such as the name of the network, tool utilized, target area and the description is shown in Table 1.

Table 1: Significant Peace building digital network

Name	Tools	Target area	Description
All for Peace Radio	Radio	Israel, Palestine	Through stories of relevance to both Israeli and Palestinian society, All for Peace Radio aids in bridging the gap between them. a collaborative project of Jewish-Arab peace centre Givat Haviva and Palestinian non-governmental organisation Biladi
Crack in the Wall	Social media	Israel, Palestine	For discussion and interaction between families who have lost a family member as a result of the Palestinian-Israeli conflict, there is a Facebook group called Crack in the Wall.
FrontlineSMS	Text messaging, the cloud	Indonesia, Kenya, Malawi, Nigeria and elsewhere	FrontlineSMS supports peacebuilding by assisting NGOs in developing nations with communication, local radio programming, and peacekeeping. has been modified to enable election surveillance to stop violence, for example in Kenya and Burundi
Groundviews	Website	Sri Lanka	A website called Groundviews allows citizen journalists to provide viewpoints on matters such as peacebuilding, human rights, and governance.
HarassMap	Text messaging	Egypt	HarassMap is a reporting system fighting sexual harassment in Egypt
Internews	Online and broadcast media	Global	Internews teaches journalists and laypeople how to use cutting-edge platforms and multilingual networks to debunk rumours in conflict zones, such as the Nile FM community radio station in South Sudan.
Peace Direct	Blogs, mobile technology	Parts of Africa and Asia	Peace Direct collaborates with local peacemakers and runs educational initiatives to promote local efforts to end disputes.
PeaceFactory	Video	Middle East	Facebook campaigns by PeaceFactory encourage users to share messages of friendship and love regardless of conflict barriers.
Search for Common Ground	Audiovisual media	Africa, Asia, Europe, Middle East, North America, South-East Asia	Through community discourse, Search for Common Ground helps find common solutions to conflict that is destructive. For instance, the goal of Radio for Peacebuilding Africa is to create, disseminate, and promote the use of radio broadcasting methods and information for peacebuilding. It held a video contest in 2012, challenging young people in Lebanon to "Shoot Your Identity."
Soliya's Connect Programme	Web-based virtual exchange	Middle East, North Africa, South Asia, Europe and North America	Through its online cross-cultural education initiative, Soliya's Connect, which brings together university students from around the world, young people from the West and societies with a predominance of Muslims are connected.

3. STATE OF THE ART

The Security Council is one of the UN's six main organs, and the UN was founded in accordance with its mandate in 1945. According to the UN's founding charter, the committee's four principal goals are to uphold international peace and security, preserve international relations, resolve international disputes, and defend human rights, as well as to foster harmony among member states' policies. The Security Council has strived to uphold this one goal while appeasing all the nations represented since its inaugural meeting in 1946. At any one time, the committee is made up of fifteen members, ten of whom rotate and five of whom are permanent (*Striving Towards Establishing Peace and Harmony with AI and UNSC*, n.d.).

AI has the potential to advance the health and well-being of people, communities, and states while assisting in the achievement of the Sustainable Development Goals set forth by the UN. Certain applications of AI, however, have the potential to jeopardise global peace and security by sparking questions about the technology's security and safety, quickening the tempo of armed conflicts, or reducing human control over the means of war.

In order to foster a multistakeholder discussion among experts from Member States, industry, academia, and research institutions, the United Nations Office for Disarmament Affairs, the Stanley Center, and the Stimson Center collaborated on a workshop and a series of papers in 2019 with the goal of increasing understanding of the implications of AI for peace and security. It is

meant to serve as a springboard for deeper discussions among various stakeholder communities as they work to maximise the advantages of AI while minimising the inappropriate use of this crucial technology.

The fifth realm of warfare—from the Kalashnikov to the keyboard—has been embraced by the global community with the advent of the twenty-first century. “Guns don’t kill people; people kill people,” it was claimed. The decisions are now made by weaponry. There are two possible results when artificial intelligence (hence referred to as AI) and robotics combine. On the one hand, our society has made immense social, economic, and political advancements. In contrast, the military develops new weapons of mass destruction using these techniques (referred to as lethal autonomous weapon systems, or LAWS), making nuclear weapons obsolete.

Lethal autonomous weapons pose a threat to global peace and security, thus 116 founders of robotics and artificial intelligence businesses from 26 nations wrote an open letter demanding the UN to outlaw such weapons. As a result, a Group of Governmental Experts (GGE) on Lethal Autonomous Weapons Systems was established in 2016 under the supervision of the United Nations Conference of the Convention on Certain Conventional Weapons (CCW). The GGE is tasked with investigating cutting-edge developments in the field of deadly automated weapons systems. However, additional steps are required to limit and outlaw the use of LAWS. In order to mandate a new international law on fully autonomous weapons, the UN Security Council is responsible.

The Sentinel Project (*Una Hakika | The Sentinel Project*, n.d.), a nonprofit organisation, has created a number of platforms to combat rumours and hate speech (*Tech for peace: Facts and figures*, n.d.). The most common hate speech target is shown in Fig. 1. One is WikiRumors, which gives false information priority and offers corrections. Conflict all over the world is shown through the Sentinel Conflict Tracking System. Nearly 500,000 items in Hatebase, an online database of hate speech, span many different countries and languages.

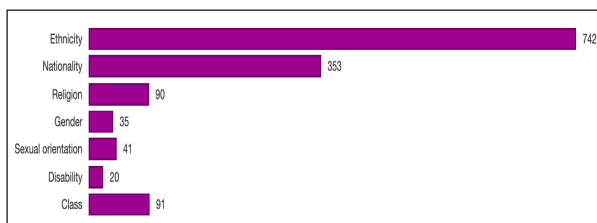


Figure 1: Most common hate speech target

Source: <https://www.scidev.net/global/features/tech-for-peace-facts-and-figures/>

4. TECHNOLOGY DRIVEN PEACE PROMOTION

In this section, some of the ways by which technology is contributing in developing peace is described in detail (*3 Ways Technology Can Promote Peace: Geneva Peace Week*, n.d.).

Sentiment Analysis

Sentiment analysis is one of the powerful tool to understand the sentiments of the public towards any policy or any matter of concern such as Politics, corruption, climate change, world peace. Big data technology and the machine learning algorithm can analyse the view of public on different social media platforms such as Twitter, Facebook, instagram etc. and authorities can take appropriate action.

Cyberspace Governance

Cyber crime is growing as the data is the most important thing in this era. Cyber crime can do great damage to the people and the government; it is as harmful as any kind of war. There is a need to provide and promote governance in cyberspace by making legal international or institutional structure to diminish the impact of cyber crime. Due to geographical boundaries and the impact of pandemic, it is challenging for the peace communities to meet and discuss things in person, even though the rise of digital and social platform allow the peace bearers to continue to share their opinions.

Satellite Imagery

The coverage of data collection from the Satellite is huge. It helps in locating the suspicious activities in the designated area. The patten drawn from the data collected could be utilized to draw attention towards any kind of non-violence or actions which violates human rights.

Artificial Intelligence Surveillance

The use of artificial intelligence (AI) technologies is expanding quickly on a global scale. Deepfake movies, which blur the line between fact and fiction, and sophisticated algorithms that can outperform the top players in the world in multiplayer poker are just a few of the startling new advancements that keep happening. Businesses use AI to enhance analytical processing, and local officials use it to monitor traffic and manage smart energy metres. However, an increasing number of states are using sophisticated AI surveillance tools to track, monitor, and surveil citizens in order to achieve a variety of policy goals, some of which are legal, others of which are against human rights, and many of which

fall somewhere in the grey area (*The Global Expansion of AI Surveillance - Carnegie Endowment for International Peace*, n.d.).

Unsurprisingly, nations with autocratic regimes and limited political freedoms are making significant investments in AI surveillance technologies. Numerous governments in the Gulf, East Asia, and South/Central Asia are purchasing sophisticated monitoring tools, facial recognition cameras, and complex analytic systems. However, liberal democracies in Europe are also moving quickly to implement automated border checks, predictive policing, secure cities, and facial recognition technology. The Fig. 2 shows the percentage of countries adopting AI surveillance.

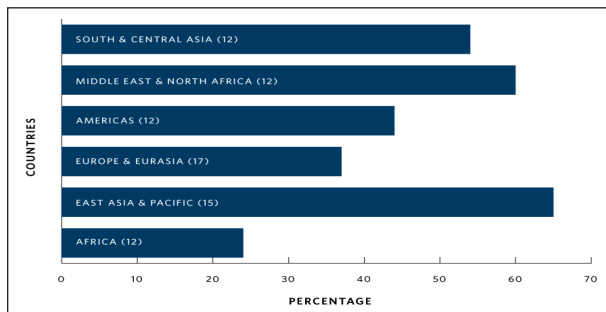


Figure 2: Percentage of countries with AI surveillance systems

Source: <https://carnegieendowment.org/2019/09/17/global-expansion-of-ai-surveillance-pub-79847>

Data Coordination:

With increase in connectivity among people, new members are added in the ecosystem of peace building and the data collected for it are enormous. There is a requirement for the better communication and the coordination system to be certain that verified data is accessible to all the people in the community across the world.

Digital Democracy

On an average, people spend almost 15% of their time on social websites or engaging into digital contents, but social media platforms are inappropriate platform for discussion on politics. In this digitally connected world, productive discussion on the country democracy is challenging. It is suggested by Emmanuel Letouze that there should be the arrangement of democracy parks digitally which provides a platform for the society and the government to discuss, coordinate and decided on various democratic inclined decisions.

Social Media and Social Communities

In present connected ecosystem, misleading information spread within seconds intentionally or unintentionally across the globe (*Six ways technology can harness*

the power of peace — Peace Insight, n.d.). The online platform such as social networking sites, forums, blogs, podcast allow the peacebuilder to stay active online and disseminate their story. Peacebuilders are utilizing the power of online communities to motivate the social change required for peace in this phase of social distancing. These platforms provide an opportunity to share the knowledge in open spaces which could open path for creating new patternship and analysis of the collection action to be taken.

The fast pace of technology has drastically changing the lives of people. It is better to adopt the hybrid approach. The peacebuilder blending the online and offline environment for maximum reach and to optimize the work. Therefore, they can connect to wider audience depending upon their geographic location. The adaptability in handling the digital and analogue tool has given peacemaker the confidence to sustain in any kind of environment. It is also vital to arise with the upcoming technology and being flexible to using it in every day to day activity. This will surely be an important parameter for effectively building peace.

Privacy and Safety

With the rise in digitalization, the researchers in this peace building should be attentive towards negative impact of technology and its digital data should be used to provide benefits to all general people and should not be the cause for any kind of harm. It should be ensured that the technology is used to promote non-violence rather than igniting violence. The spread of hatred speech, misleading information and the provoking statements should be prevented and ensured that the online data of all individuals should be protected. The expert of peace building and human rights should be included in the conversation for better accountability and transparency.

Conflict Resolution Using Network Analysis

Almost all people around the world are connected to social network. Some people are influential in a network and in case of conflict, their opinion really decide the wave of heat in any direction. Peacemaker can decide whom should be contacted for maintaining stability. There are APIs which provide interface for the analysis of the connected network and could able to identify the people who are influential in any network.

5. KEY INITIATIVES UTILIZING TECHNOLOGY FOR PEACE

As an illustration, the Pakistani organisation HIVE uses holographic technology to bring to life its teachings of social cohesion and interfaith dialogue by narrating their

story digitally and promoting peace. People from all over the world can participate in online debates about topics like youth-led peacebuilding and the effects of COVID19 thanks to Platform4Dialogue, which Peace Direct created in 2019. These internet networks can support the online expansion of successful peacebuilding efforts and outreach while strengthening civil society as a whole (*Six ways technology can harness the power of peace — Peace Insight*, n.d.).

Consider the crowdsourced data mapping project Safecity in India. They encourage women to report instances of sexual assault anonymously to their platform, which compiles and interactively maps the information. They have gathered more than 12,000 accounts of sexual assault in public settings to date, highlighting high-risk areas for violence while also finding trends and hotspots.

A study by the Australian Strategic Policy Institute and ABC News that used satellite images to assess the number and distribution of Uyghur internment camps in western China was described by Branka Panic from the NYU Center on International Cooperation. Nigerian civilians are faced with two social media puppet masters in the context of the Boko Haram fight, according to Dr. Medinat Abdulazeez Malefakis, Research and Information Analyst for the Norwegian Refugee Council's Assessment Capacities Project: Boko Haram and the Nigerian government. Nigerians utilise social media in response to immediately share their experiences with the crisis and dispel rumours among themselves.

A Peacebuilding and Conflict Prevention Data Hub, modelled after the Humanitarian Data Exchange, was proposed by NYU's Branka Panic. The Taiwan crowdsourced consensus-building platform and the e-Democracia virtual communities set up by the Brazilian Chamber of Deputies are two current examples of Digital Democracy Parks.

More than 1000 stakeholders from various sectors joined together to launch the Paris Call for Trust and Security in Cyberspace in 2018, which aims to establish nine guiding principles for the security of cyberspace. The Paris Call has the ability to promote peace and security in the digital sphere by bringing together governments, internet corporations, researchers, and civil society.

6. FUTURE PERSPECTIVE ON TECHNOLOGY SHAPING PEACE

There are some digital technologies to watch and others that are beginning to have an influence as technological advancement broadens the possibilities for peacebuilding. Drones, virtual reality, and video games are all included.

With help from the social company Build Up, the UN Development Programme and the UN Alliance of Civilizations (UNAOC) have created PEACEapp, a competition that highlights online games and apps that promote intercultural understanding and conflict resolution. Through the use of shared virtual experiences to foster trust, the online community Games for Peace works to narrow the trust gap between young people in the Middle East and other conflict areas (*Peacekeepers in the Sky: The Use of Unmanned Unarmed Aerial Vehicles for Peacekeeping — ICT4Peace Foundation*, n.d.).

Users of The Enemy, an immersive virtual reality experience that fuses artificial intelligence and empathy neuroscience research, come face to face with the concepts of enemy and empathy, expanding their understanding of protracted battles.

Medical and humanitarian organisations engaged in disaster response are already testing virtual reality projects. Some claim that these programmes can aid in educating local people on how to handle calamities, including armed confrontations.

Aerial drones, despite their reputation as weapons of war, are being used in peacekeeping operations. These remotely piloted aircraft systems can be employed for humanitarian micro mapping or for surveillance to maintain order and protect civilians.

Since they are a part of intricate political, economic, and social systems, technologies cannot be used to resolve conflicts on their own. And as a result of these intricate relationships, technology both contribute to and are responsible for social development. In the end, they can aid in fostering the understanding that is “an vital ingredient in conflict prevention and post-war reconciliation,” according to Kofi Annan, a former UN secretary-general.

7. CONCLUSION

Globalization processes should encourage social and economic communities to enter an era of expansion focused on world wealth and peace. Developing technology as a means of encouraging processes of collaboration and cooperation among private and public organisations, within cities, through businesses going digital to design business ecosystems interacting with communities, is essential to creating an enduring and fruitful status of peace in the modern world. In order to achieve and maintain peace as a source that enables social, economic, and public value creation, private and public organisations, businesses, and communities should be motivated by the advent of digital technology to create

new mechanisms of cooperation and collaboration. This will lead to the transition from business global ecosystems to sustainable communities.

Rediscovering the community by combining the forces and drivers of globalisation, technological, and digital sources and advancements to enable organisations and businesses to create sustainable social, economic, and public value helps build peace by removing obstacles to coexistence such as cultural, religious, and ethnic barriers to ensure better quality of life for people living in a territory to create values and meanings.

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Analysis of level of Variation of Job Satisfaction for Permanent and Temporary Employees: Evidence from Delhi NCR?

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Abstract— Purpose: The purpose of this paper is to explore the effect of job characteristics on the job satisfaction of employees. Moreover, the research also explores the comparison of job satisfaction for temporary and permanent employees within their different work roles. Apart from this, the study also examined the moderating effect of age.

Research Methodology: Primary information has been gathered from 138 employees of various industries in Delhi and applied multiple regression analysis, correlation analysis, t-test and moderation analysis to analyse the data.

Results: Multiple regression analysis proves that job characteristics and their dimensions significantly and positively influence employees' job satisfaction (.888). Further, the t-test exhibits a significant variation in the job satisfaction of permanent and temporary employees (t-value 6.890; p-value .000). Using process 2.13 version for the SPSS and interaction software, the study also finds that age groups moderate the relationship between job characteristics and job satisfaction and younger employees are affected more than other age groups (10.438; p-value .000).

Practical Implications: Considering the effects of age diversity on the relationship between job characteristics and job satisfaction would be helpful for organizational policies. The study also points out that differences in the attitude of employees also should be considered to make better HRM policies.

Novelty: In the Indian context very few studies investigated the behaviour of temporary employees, although studies are abundant on permanent employees. Hence this study would fill the much-needed gap.

Keywords: Job Characteristics, Job Satisfaction, Autonomy, Task Variety, Task Identity, Task Significance, Feedback, Contingent Employees

JEL Classification: J21, L0, M51

1. INTRODUCTION

Today in the era of the globalized economy satisfaction of employees is vital to achieving excellence and competitive advantage for an organization (Behera et al, 2020). Satisfaction of employees is an essential attribute for organizational productivity, effectiveness, development and retention of employees. Following this, Ofosuhene & Sammo (2020) exhibited that the satisfaction of employees is a key factor and root of the continuity of an organization. In other words, to remain at its peak, every organization has to keep attached and satisfied their every group of employees. Job satisfaction among employees depends on the job attributes and job facilities provided by the organization (Morf et al., 2019). Based on the above affirmation the study of Verma (2017) also exhibited that job attributes consequently play an important role to enhance the satisfaction level of permanent and temporary employees. Today in the environment of economic flexibility temporary workforce has become an essential part of every organization to compete with changes in the business environment. A temporary workforce has been provided numerous benefits to the organization; for instance, they work without receiving any extra benefits (Bhandari and Heshmati, 2006), enhance work flexibility (Kalleberg, 2000; Thorsteinson, 2003), less costly (Krahn, 1991; McLean Parks et al., 1998), and lack of responsibility (Wooden & Warren, 2004). Although the temporary work system has numerous benefits, they are neglected by organizations in the distribution of job facilities and compensation (Behery et al., 2012; Bhandari & Heshmati, 2006; Chambel and Castanheira, 2006; Krahn, 1991). For instance, the study of Slattery et al. (2010) exhibited that temporary employees are less satisfied with their job characteristics as they received fewer job facilities. Others studies also exhibited that there is a difference in the attitude between permanent employees and temporary employees (Bhandari and Heshmati, 2006; Kalleberg, 2000). Various theoretical surveys have also added similar results to the concept,

but there is a lack of empirical studies on temporary employees and their attitudes in the Indian context. This study compares the satisfaction level of permanent and temporary employees in the Indian context; which is not highly considered. First of all, the study examines the linkage of job characteristics and their dimensions with job satisfaction. The study also explores the moderating role of age groups, which is not yet explored for the relationship between job characteristics and job satisfaction.

2. THEORETICAL FRAMEWORK AND HYPOTHESIS FORMULATION

Job Satisfaction

Job satisfaction has considered a broad and widely studied concept of social science and human resource management. In 1920 Elton Mayo coined the concept of job satisfaction defined it as the pleasure of employees with a job and job relationship. Within the time various researchers described job satisfaction in different contexts. Following this, Ofosuhene & Sammo (2020) defined the concept of job satisfaction as a complex combination of various job aspects attached to the feelings of employees. Further, the survey by Avani Jain et al. (2021) described job satisfaction as the satisfaction of employees depending on the level of liking of job attributes. Further, the study of Slettery et al. (2010) studied the job satisfaction of permanent as well as temporary employees and exhibited a significant difference in job satisfaction levels. Following, David et al. (2000) also confirmed the difference in the job satisfaction level of temporary employees. Various studies also exhibited similar results (Andrade & Westover, 2018; Robbins, 1989). In the Indian context, very few studies have attempted to examine the difference between the job satisfaction of permanent and temporary employees and the behavior of the temporary. This survey is an attempt to fill this research gap.

Job Characteristics

The concept of job characteristics has been introduced by Hackman & Oldham in 1975. In this survey, they explained the model of job characteristics with five dimensions namely job variety, job significance, autonomy, feedback and job identity. These dimensions explained as autonomy is defined as the degree of freedom to take decisions regarding the job, job variety explain as the task and skills required to complete the job goals, job identity described as the job type, job significance defined as the job value attached with the job and feedback explained as a communication system in which all job-related information communicated to the employees. Further, various researcher works on this

model in different research contexts. Some researchers also added additional dimensions. For instance, the survey of Stuart et al. (2008) explores the new dimensions of job characteristics viz. interdependence, job involvement and management support. Following, Ofosuhene & Sammo (2020) also investigate various dimensions viz. work advancement, work autonomy and nature of the work.

Review of Literature

Different studies have been conducted on the relationship between job characteristics and job satisfaction and exhibited a positive linkage between the variables. The study of Hakman & Oldham (1975) explored the reactions and behaviour of the employees regarding job characteristics and exhibited the positive effect of job characteristics on job satisfaction. Based on the above results Brief & Aldag (1975) also survey to analyse the effects of job characteristics on affective response and found the positive effects of the job factors on job satisfaction. In this context, Stuart et al. (2008) examined the job characteristics linked with job satisfaction of temporary employees and permanent employees. Results exhibited a positive relationship between all dimensions of job characteristics with job satisfaction of employees. Further, the study revealed that job autonomy is lower for temporary employees in comparison to permanent employees. Slattery et al. (2010) examined the linkage between job characteristics and job satisfaction in the context of temporary employees. Results revealed that job characteristics positively and significantly attached to the job satisfaction of employees. The study also conveys the difference in the job satisfaction of temporary employees and permanent employees. Following, the study by Ozturk et al. (2014) also explored the basis of the Hackman & Oldham (1975) model and its effects on the job satisfaction of employees. Further, the study added a positive and significant linkage between job characteristics and its dimensions with the job satisfaction of employees. In other words, job and job attributes have vital to retaining employable and skilled employees. To attract and retain human resources it is a must to be satisfied each and every group of employees with their job factors. Further studies (Ofosuhene & Sammo, 2020; Ozturk et al., 2014; Slattery et al., 2010; Stone & Porter, 1975) also explored the same results. Based on the above review of the literature we formulate the Hypothesis.

Objectives

1. Whether the job characteristics influence job satisfaction?
2. Whether the job satisfaction level is different for temporary employees?

3. Does Age moderate the relationship between job characteristics and job satisfaction?

Research Hypothesis

H1: Job characteristics significantly and positively influence job satisfaction.

H2: Autonomy significantly influences job satisfaction.

H3: Job variety on job satisfaction.

H4: Task identity on job satisfaction.

H5: There is a positive effect of task significance on job satisfaction.

H6: There is a positive effect of feedback on job satisfaction.

H7: Differences is exists between the job satisfaction of permanent employees and temporary employees.

H8: Age groups moderate the linkage between job characteristics and job satisfaction.

III. DATA AND METHODOLOGY

III a. Variable

Job characteristics (Independent variable): Measure of Morgeson & Humphery (2006) measure the job characteristics contract with a five-point Likert scale. The reliability of the scale is confirmed, with .896 alpha values (Table 2). And its five dimensions: autonomy, job variety, task identity, job significance and feedback, also proved reliable with Cronbach's α being .948, .969 .972, .792, and .955, respectively.

Job satisfaction (Dependent Variable): Items of job satisfaction have been taken from the Minnesota satisfaction questionnaire (MCQ) of 1967. Cronbach's α of the scale is .924, which proves the reliability of the scale (Table 2).

Control Variables: Type of the post, Nature of the organization, age, gender, qualification and type of organization were treated as control variables.

Moderating Variables: Age

III b. The Sample and Procedure

Descriptive statistics have been conducted to find out the demographic knowledge of respondents (Table 2). A total of 230 questionnaires were distributed to determine the response, from which 180 questionnaires were filled and out of which 42 were unusable filled questionnaire. Thus, 138 responses were kept in the analysis. The data were taken from the corporate sector of Delhi. Table 1 shows the demographic knowledge of the respondents.

Table1. Demographic analysis

Categories	Sub-categories	Frequency	Percentage
Type of job	Permanent employees	83	60.1
	Temporary employees	55	39.9
Nature of the organization	Manufacturing	50	36.2
	Service	88	63.8
Gender	Male	105	76.1
	Female	33	23.9
Age Group (in years)	20-35	92	66.7
	36-45	20	14.5
	46-60	26	18.8
Type of organization	Hospitality	5	3.6
	Banking and Finance	44	31.9
	Healthcare	19	13.8
	ITES&IT	13	9.4
	Others	57	41.3

Source: Primary data.

Table 2. Reliability test

Variables	No. of Items	Cronbach's alpha
Job satisfaction	18	.924
Job Characteristics	24	.896
Autonomy	9	.948
Job Variety	4	.969
Job Identity	4	.972
Job Significance	4	.792
Feedback	3	.955

Source: Primary Data.

III c. Tools and Techniques: For analysing the data following statistical tools were used: multiple regression analysis, an independent sample t-test with IBM SPSS version 21 and moderation analysis with process macro 2.13 versions for SPSS and interaction software.

IV. RESULTS AND DISCUSSION

Table 3. Multiple regression assumptions testing

Multicollinearity		Durbin-Watson	Cook-distance	P-P Plot	Scatter-Plots
VIF	Tolerance scores	1.569	1 ≤	Normal	Linear
1.0	1.0				

Source: Primary Data.

The study satisfied all assumptions of multiple regressions (see Table 3). The Scatter plot showed that data is linear and there is no multicollinearity, as VIF scores are below 10 (1.0) and tolerance scores are above .02 (1.0). The condition of independence of residuals is also met as the

Durbin-Watson analysis's value is close to 2 (1.569). The normality assumptions and no biases are also satisfied by the standard p-p plot and cook distance value, which is less than 1.

Table 4. Multiple Regression Analysis

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	.475	2.164	2.692	2.689	2.524	2.259
Job Characteristics	.888					
Autonomy		.404				
Job Variety			.233			
Job Identity				.270		
Job Significance					.326	
Feedback						.363
R. square	.474	.255	.073	.169	.157	.223
Adjusted R	.470	.250	.066	.163	.150	.217
F Statistic	122.375	46.573	10.663	27.678	25.254	39.077
N	138	138	138	138	138	138

Source: Primary Data.

Multiple regression analysis shows that overall job characteristics significantly and positively affect job satisfaction (Table 4). The model 1 p-value is .000 proved significant with an F value of 122.375 and R square is 47.4 % which explains the variation in job satisfaction defined by job characteristics. In Table 4, the beta value is 0.888, which explains the slope for job characteristics, and the corresponding t value is 11.062. Similarly, model 2, model 3, model 4, model 5 and model 6 (see Table 4) showed significant results to justify hypotheses. The above results indicate that job satisfaction is significantly affected by all independent variables, which leads to the acceptance of all hypotheses (see Table 8).

Table 5. Differences in job satisfaction between employees regarding job characteristics

Dimension	Post	N	Mean	S.D.	t-test	Sig.
Job Satisfaction	Permanent	83	3.981	.5330	6.890	.000
	Temporary	55	2.969	.9986		

Source: Primary Data.

Comparative Analysis (Independent t-test)

Various studies exhibited that permanent and contingent employees differ in receiving the facilities (Gupta & Gupta, 2013). To find out the difference between the

satisfaction levels of both types of employees regarding their job characteristics, an independent sample t-test is conducted. The results found a difference in the attitudes of employees. The mean and S.D. of permanent employees' response is 3.98 ± 0.533 , and the mean and S.D. of contingent employees is 2.96 ± 0.998 . The value of the t-test is found to be 6.89 (see table 5), (P-value 0.000) significant level, which demonstrates that permanent employees are more satisfied than contingent employees, so H7 is accepted.

Moderating Effect of Age Groups

The moderating factor is the variable that can change the direction and affect the strength of the linkage between independent and dependent variables (Baron, 1986). To analyze the moderating effect, a dummy variable age was created with three groups. Group I consisted of employees aged 20-35 years, group II consisted of employees in the age group of 36-45 years employees, and group III represented the 46-60 years age group.

For testing the moderation effect of age, we used process 2.13 versions for SPSS with bootstrapping procedure taking 95% confidence intervals. Results show job characteristics' impact on job satisfaction is moderated by age and is more significant for young age employees (Table 6c). For group I, the code is (0, 0), for group II, the code is (1, 0), and for group III (0, 1) (see Table 6a). As we selected the option only continuous variable that defines products, so constant predicted the first group's interaction results, interaction1 was for group II. Interaction 2 was for group III (see Table 6b). In this table, the p-value shows that all the interaction results are significant ($p < 0.05$). Further results show that the p-value for each group separately was also substantial ($p < 0.05$) and show moderating effect between the association of job characteristics and job satisfaction (see Table 6c). Following are the effects of each group: for the first group (1.035, t-value 10.438), for the second group (.503, t-value 2.098), and for the third group, it is (.640, t-value 4.040). Results also show that the young age group (1) has high moderating effect than other age groups (1.035). Graphical results again prove the same results (figure 1) and confirmed that H8 is true.

Table 6 a. Coding of Categorical Variables

Age group	W1	W2
Age group I	.000	.000
Age group II	1.000	.000
Age group III	.000	1.000

Source: Primary Data.

Table 6 b. Interactions of Moderating Effect

	Coef- ficient	SE	T-value	P-value
Constant	3.344	.067	52.591	.000
Job Charac- teristics	1.035	.099	10.438	.000
W1	.218	.162	1.344	.181
W2	.092	.143	.644	.520
Interaction1	-.531	.259	-2.048	.042
Interaction2	-.394	.187	-2.108	.036

Source: Primary Data.

Table 6 c. Conditional Effect of Model

Age cate- gories	Effect	Boot SE	t- value	p- value	Boot LICI	Boot ULCI
1.	1.035	.099	10.438	.000	.839	1.231
2.	.503	.240	2.098	.037	.028	.978
3.	.640	.150	4.040	.0001	.327	.954

Source: Primary Data

Graph

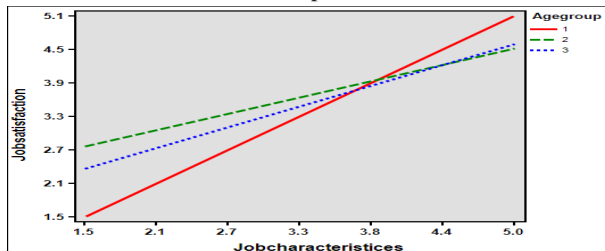


Figure 1. Moderator Analysis

Notes: Group I (20-35 years of age)

Group II (36-45 years of age)

Group III (46-60 years of age)

Table 7. The Hypothesis with their Supportive Justifications.

Hypothesis	β Coefficient	T- value	P-value	Result
H1:	.888	11.062	.000	Accept
H2:	.404	6.824	.000	Accept
H3:	.233	3.265	.001	Accept
H4:	.270	5.261	.000	Accept
H5:	.326	5.025	.000	Accept
H6:	.363	6.251	.000	Accept
H7:	–	6.890	.000	Accept
H8:	–	10.438	.000	Accept
		2.098	.037	
		4.040	.0001	

Source: Primary Data

V. DISCUSSION AND CONCLUSIONS

This survey has been conducted to examine the effect of job characteristics on job satisfaction in the Indian context. The results of the study convey the significant and positive effect of job characteristics on permanent and temporary employees' attitudes (.888). The empirical conclusion has been drawn using correlation, multiple regression analysis and moderator analysis. The results suggested a significant association between autonomy and job satisfaction (.404). Similarly, other dimensions of job characteristics also show a positive relationship with job satisfaction. Various researchers' studies also added the same results (Brief & Aldag, 1975; Hackman & Oldham, 1975; Olanrewaju and Ifenna, 2011). Although some researchers found contradictory results about some dimensions such as Ozturk et al. (2014) exhibited that job variety is not significantly related to job satisfaction. Since most of the studies revealed that all dimensions of job characteristics significantly and positively affect the job satisfaction of employees. Furthermore, the value of the t-test analysis revealed that permanent employees are more satisfied with job characteristics. Most of the studies also convey this result (Bhandari and Heshmati; 2006; Ntisa et al., 2016; Verma, 2017). These results are helpful in decision making of policy-makers and in HRM practices with different work-status. The results suggested that satisfied workforce is the key of organizational success, so employers have to gain positive behaviour of each group of employees by providing the better and equal job attributes.

The study also conducted the moderator analysis, and the results convey the moderating effect of age. It explored that the young age group is affected more than age other groups as (Colquitt et al., 2016) also exhibited that younger employees are more involved and conscious of development activities. Results help make managerial decisions in an environment of age diversity. The study concluded empirical evidence of the positive effect of job characteristics on job satisfaction and young age employees are more conscious of job characteristics. The results also added differences in the behaviour of the temporary and permanent employees. In sum, empirical evidence of the study is helpful in strategic management and policy-making that enhances employee job satisfaction. As the evidence exhibited that temporary employees are also beneficial for the organization as permanent employees. But they were neglected, so having different attitudes and behaviour. It is considerable for an employer to provide equal job attributes to all employees and create an environment of justice and equity to enhance the positive behavior of each employee.

VI. RESEARCH GAPS AND FUTURE SCOPE

This study is cross-sectional as the survey is based at one point in time, so inferences may be different for longitudinal studies. Next, the limitation may be considered that data collected from Delhi, so results may vary for other geographic/sociological areas. Most of the studies have been conducted by taking a sample of permanent employees and less attention has been given to studies on temporary employees. Future studies can be conducted on the comparison of permanent employees and temporary employees, taking sample of specific sector.

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Data Compliance Architecture for Managing Organizations Local and Global Data Using Data Virtualization

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Abstract—In today's globalized world organizations crossing boundaries and doing organizations in various countries and regions. These organizations work in various sectors and industries. With strict data compliance and data privacy laws, organizations need to adhere local laws and store sensitive data in countries boundary and need to abide local land laws regarding data compliance. To sustain and compete in a competitive environment organizations make use of data they generate. The data consumption depends on the location of head office or location of top higher management. To consume data for various needs, organizations required data compliance and privacy protection data management framework.

The aim of this paper is to study how a data virtualization platform can help organizations to adhere data compliance and data privacy. To maintaining balance between local and global data needs based on data sensitivity and further help to build data compliance system architecture using data virtualization solutions.

Keywords: Data compliance, data localization, compliance framework, data virtualization, data compliance management system

Objective

To study data compliance challenges faced by organizations

To study data compliance framework

To analyse role of data virtualization in mitigating compliance requirements

To generalized data compliance architectures

INTRODUCTION

In a globalized environment, organizations work in many countries and regions. These organizations work in various sectors such as finance, healthcare, pharma, banking, food safety, information technology, insurance, environment, intellectual property, security exchange,

telecommunication etc. Each organizations generates vast amount of data based on size and sector they are working. The data includes organizations data, personal identification information, medical information, product data, service data and other sensitive information. Organization need both global and local data for their business requirements, oprtations and analysis. To protect the privacy and security of personel information many contries laid down regulations also know as data compliance.

Despite these regulation to thrive in todays competative world organizations need to use data for many purposes while adhering to regulations. To do so organization s need to manage local & global datasets based on data sensitivity.

ORGANIZATIONS NEED FOR LOCAL DATA AND GLOBAL DATA

Local data means generating, collecting, processing, storing, sharing and reporting sensitive compliant data within regulators' confined boundary on the other hand global data from data usage point means using data for various gains such as competitive advantage, sentiment analysis, advance healthcare, better product and service development.

Globally new data compliance regulations are promoting data localization. There are numerous reasons to do so but for organizations it poses challenges in numerous ways including growth, cross border organizations, data analysis, data movement for various gains such as encourage economic competitiveness, new product and service development, product and service review analysis, various organizations focus on analysis such as sales, marketing and man power (human resource) analysis. Managing compliance for local and global data requires a comprehensive approach that takes into account the specific regulations that apply to each jurisdiction where the organization operates.

Steps for managing compliance

1. Regulations - Identify applicable regulations
2. Establish policies and procedures
3. Implement technical and organizational measures
4. Conduct regular audits and reviews
5. Build centralized system

COMPLIANCE

Data compliance refers to the practice of adhering to laws, regulations, and standards related to the collection, processing, storage, and sharing of data. This includes protecting the privacy and security of personal information and ensuring that data is used in a legal and ethical manner. Data compliance is the process of achieving the minimum required data protection made mandatory by compliance authority in law. To be compliant means organizations has to take and implement measures, process, procedures, workflows, frameworks and operations layout designed to ensure the obligations made by authority are fulfilled.

In other teams it means the process of adhering to various regulatory standards, laws, governance, and legislations to maintain integrity, and availability of data. Data compliance include data source, data processing, data collection and data reporting of regulated data such as personal and sensitive data. Data privacy is the concept of how an individual's personal information is collected, processed, stored and shared. Data compliance comes in practice to help ensure the protection of regulated and/ or sensitive data from unauthorised access and use. Data compliance also tracks what kind of data and how much data is being stored and how this stored data is being utilized and managed throughout its data lifecycle.

Here are some of reason for data compliance guidelines:

- Data security (Data misuse and unauthorized access)
- Customer trust
- Rapid data growth
- Competitive advantage
- Use of data for market analysis, sentiment analysis
- Cyber security threats
- Mobile data such as social media content
- Data privacy
- Access to data by law enforcement agencies
- National security

Challenges posed by data compliance to organizations:

Data compliance pose many challenges to organizations, are as following:

- Complexity of regulations
- Constantly evolving regulations
- Risk of non-compliance
- Financial cost (Penalties)
- Legal risk
- Operational disruption
- Reputation damage
- Technical challenges
- Regulatory challenges
- Impact on business operations
- Lack of resources
- Technology constraints
- Data silos (Volume, Velocity, Variety)
- Human errors
- Protection of the vulnerable
- Conflict of laws

Around the globe there are 71% countries with data compliance legislations, 9% countries with draft legislation, 15% countries have no legislation. These countries follow several data compliance standards. Compliances such as GDPR, HIPAA, PIPEDA, CCPA, PCI DSS, FACTA, ISO/IEC, COPPA, POPIA, NIST, SOX, PDBP, DCIA, PIPL, FedRAMP etc. and organizations need to comply with these standards at any cost, so they can pursue their organizations depending on their operation and location in which these organizations operates.

Following measures organizations can take to handle data compliance and overcome challenges:

- Access and identity control
- Set up data compliance architect (including Protection against malware and cyber attacks)
- Build data flow pipelines (Including Data loss prevention, Control over data sharing)
- Set up alerting and notification system (Monitoring, Incident response and reporting)
- Acquire data compliance management system (Compliance Review)
- Develop organizations continuity plan (Disaster Recovery)

- Acquire auditing system (Internal & External Audit)
- Train & improve people for data security & privacy
- Regulatory compliance training for compliance obligations
- Make sure data protection measures are up to date
- Maintain records of data protection measures and audit procedures
- Appoint data security and compliance standards personnel (Compliance Officer)
- Adopt common control framework
- Establish and maintain your policies and procedures
- Continual improvement
- Legal requirements: Many organizations are subject to legal and regulatory requirements that require them to comply with specific rules and regulations.
- Risk management: Compliance frameworks are designed to help organizations manage risk by identifying potential areas of non-compliance and implementing controls to mitigate those risks.
- Efficiency: A compliance framework can help organizations to streamline their compliance activities by providing a structured approach to compliance management.
- Competitive advantage: A compliance framework can also provide organizations with a competitive advantage by demonstrating their commitment to compliance, risk management, and responsible organizations practices.

Cross Regulatory Compliance Strategy

Cross regulatory compliance strategy determines in what ways data privacy regulations overlap in order to synergize compliance efforts. The most common requirements include protection of sensitive data and data protection impact assessments, sensitive data retention process, procedures and policies, data breach alert and notifications. To achieve data compliance one has to achieve the minimum standard outlined by the authorised body in data protection compliance law.

DATA COMPLIANCE MANAGEMENT SYSTEM

To address challenges arises due to compliance, businesses need to implement data compliance management system and establish clear policies and procedures for data collection, processing, sharing, and storing. Data compliance management system is framework that helps organizations manage their compliance with data protection regulations. The system includes policies, procedures, tools and technologies. The system helps organizations monitor, control and protect the personal data they collect, process and store.

DATA COMPLIANCE FRAMEWORK

A compliance framework is an important data management system for organizations to manage their compliance obligations and ensure that they are operating within legal and regulatory requirements. A data compliance framework is a set of policies, procedures, and practices designed to ensure that an organizations complies with legal, regulatory, and industry requirements related to data protection and privacy.

There are many reasons why organizations need a compliance framework, including:

- Continuous improvement: A compliance framework provides a structured approach to compliance management that enables organizations to monitor their compliance performance, identify areas for improvement, and implement corrective actions.
- Centralized system: A compliance framework provides a centralized unified view of data across multiple data sources.

Benefits of implementing a data compliance framework include:

- Reduced risk of legal and regulatory penalties
- Increased customer trust and loyalty
- Improved data security
- Enhanced reputation and brand value
- Increased operational efficiency
- Reduced human errors
- Mitigate penalties
- Build a Positive Reputation among Employees, Customers, and the Public
- Achieve Higher Employee Productivity and Higher Employee Retention

CENTRALIZED SYSTEM

Data virtualization is useful tool for data compliance as it provides a unified view of data across multiple sources located round the globe in different regions and countries. Centralized system provides a unified solution for managing local and global data with comprehensive approach.

Benefit of using centralized system for data compliance:

- Data privacy
- Data governance (Centralized platform for data lineage, data quality, and data security policies)
- Data integration
- Data access
- Data management

DATA VIRTUALIZATION (LOGICAL DATA WAREHOUSE)

Data virtualization is a technology that allows data to be accessed and manipulated without physically moving or replicating it. It provides a unified view of data from multiple sources, including databases, data warehouses, and cloud-based applications, by creating a virtual layer over the physical data sources. Data virtualization help organizations manage data compliance by providing a unified view of data across multiple sources, implementing data privacy and data access controls, and centralizing data governance and data management policies and procedures.

Data virtualization enables organizations to improve analytics effectiveness and reduce analytics infra and manpower cost by building virtual data abstraction layers from diverse data sources. Data virtualization enables organizations to integrate, access and fetch data from multiple sources without moving data from one source to be integrated into target data store. Data virtualization is a data management platform, it provides consolidated and integrated data to consumers and downstream applications such as api's and analytical tools without data movement which is required in traditional data consolidation and integration approach. In nutshell data virtualization is a platform that allows organizations to access and integrate data from multiple sources without physically moving, duplicating or replicating the data.

Role of data virtualization in data compliance:

Data virtualization provides a unified and integrated view of data, which can help organizations to improve their data compliance practices in ways mentioned below:

- **Data governance:** Data virtualization can help organizations to improve their data governance by providing a centralized integrated view of data that is consistent, accurate, and up-to-date. This can help organizations to better manage data quality, access controls, and data lineage, which are important aspects of data compliance.
- **Data security:** Data virtualization can also help organizations to enhance their data security by providing a layer of abstraction between data sources

and end users. This can help to reduce the risk of data breaches and unauthorized access to sensitive data, which are important compliance requirements.

- **Streamlined compliance reporting:** Data virtualization can help organizations to streamline compliance reporting by providing a centralized view of data that is consistent across different systems and applications. This can help to reduce the time and effort required to prepare compliance reports and ensure that the reports are accurate and up-to-date.
- **Improved data privacy:** Data virtualization can also help organizations to improve data privacy by providing a mechanism for controlling access to sensitive data. By providing a centralized view of data, organizations can more easily identify and manage data that is subject to privacy regulations.
- **Data masking:** Data virtualization can also be used to mask sensitive data by replacing it with a non-sensitive value. This can help organizations to comply with data privacy regulations by ensuring that sensitive data is not exposed to unauthorized users.
- **Data lineage:** Data virtualization provides a complete view of data lineage, allowing organizations to track data usage and ensure that data is being used in compliance with legal and regulatory requirements. This can help organizations to demonstrate compliance with data privacy regulations.
- **Data quality:** Data virtualization can also help organizations to ensure that data is accurate and consistent, which is an important requirement for compliance with regulations. By providing a real-time view of data from multiple sources, data virtualization can help organizations to identify data quality issues and take corrective action.
- **Compliance reporting:** Data virtualization provides a centralized view of data from multiple sources, making it easier for organizations to generate compliance reports and demonstrate compliance with legal and regulatory requirements. This can help to reduce the administrative burden of compliance reporting and ensure that organizations are meeting their compliance obligations.
- **Data protection:** Data virtualization can facilitate data protection by allowing organizations to apply data masking, anonymization, or encryption techniques at the virtualization layer. This can help to ensure that sensitive data is protected, even when it is being used in multiple applications or shared

with external partners.

- **Reduce compliance costs:** Data virtualization can help to reduce compliance costs by providing a more efficient and cost-effective alternative to traditional data integration approaches that require data to be physically moved or replicated. This can help organizations to manage their compliance obligations more efficiently, and can reduce the cost of compliance.
- **Data localization:** Data virtualization can help to build sensitive data localization within physical boundaries of regulatory jurisdiction. Which deeply helps organizations to localize critical, personal and sensitive data.
- **Data globalization:** Data virtualization can help to build non compliant data gateway for access from other locations. This data helps to build analytics to gain insights from underlying data.
- **Summarize data:** Data virtualization can help to build data summaries with help of virtual integration of localized summaries to total summaries of most critical key performance indicators of organizations. With data virtualization there is no need for data movement for creating summaries from multi-region, multi-country spanned data silos.
- **Data to insights turn around time:** Data virtualization greatly reduces the time required to generate insights from dispersed data silos.
- **Virtual data model reusability:** The data models prepared in a data virtualization platform can be reused or repurposed for different case scenarios.
- **Change management:** Data virtualization reduces the time required to implement changes which are a vital part of data compliance as there is no need for data movement.
- **Data pipelines:** The pipelines built within data virtualization platform helps compliance personnel about all the changes made to data with help of data lineage capability. It helps to back track issues if they arise due to not following data compliance processes.

Data virtualization layer handles:

- Real time data access
- Data integration without need of data replication
- Data transformation
- Data federation (collect, cobine and exchange data across multiple data sources)

- Logical data integration across all sources from different geographies
- Prompt in handling changing business requirements
- Improved data governance
- Data privacy
- Data security & protection
- Data marking
- Data lineage
- Data access control (Centralized)
- Helps in managing local and global datasets
- Helps in complying with data protection regulations

DATA VIRTUALIZATION BLOCK SOLUTIONS

In order to transform raw data to meaningful insights, organizations need to integrate data from multiple sources, the source data sets are actionable, trustful and raw in nature. To gain insight from raw data organizations need to infuse organizations logic, which enhances the value of data. Doing so traditional practices are not with time to handle various data related aspects, such as data compliance and data privacy.

To manage compliance related concerns, organizations need to adopt more advance techniques such as data virtualization techniques, which is industry proven practice followed by various organizations. Data virtualization tackle challenges pose by data compliance by differentiating between local data sets and global data sets. Which further helps organizations to draw and segregate data based on compliance regulations and make use of data silos for building insights.

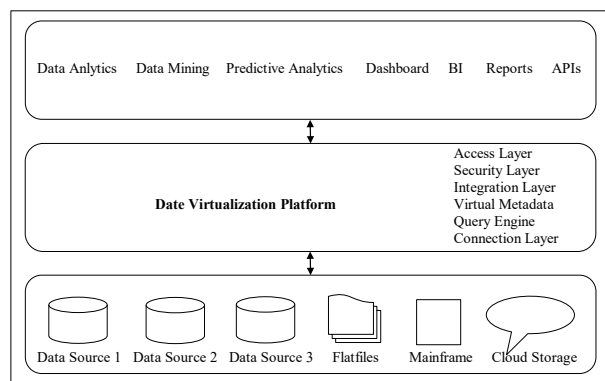


Image 1: Data Virtualization Block Architecture

The data virtualization block architecture generalised for more robust adaptation includes 3 major components, data sources, data virtualization platform and data consumption platforms respectively. The sources are of various kinds

and need to integrate data despite their physical presence due compliance norms.

In data virtualization layer, data from various data silos and systems are integrated, abstracted and secured with various techniques. This give organizations an wholesome view of entire data lanscape. In this layer data is not moved physically, by using virtual master and worker nodes they are integrated as per requirement and as per use case. Worker nodes reside in specific geography and act as data center and abstraction layer, and based on compliance norm it feeds data to master node. Master node on other hand do the integration and security management. The settings of master node and worker node are not standard, as per requirement can be modified.

Consumption layer uses the underlaying platform for insight development and data insight consuption for organizations needs.

DATAVIRTUALIZATIONDATACOMPLIANCE PLATFORM ARCHITECTURE

The data compliance data virtualization platform architecture provides the landscape and layout of standard components required for more robust and secure compliant platform.

There are various building blocks of compliance platform are as follows:

- Region/ conutry specific data centers (Master & Worket Nodes)
- Enterprise-wide data virtualization platform
- Compliance reporting service
- User authorization
- Data & User policy engine
- Infrastructure gateways & firewalls
- User authentication

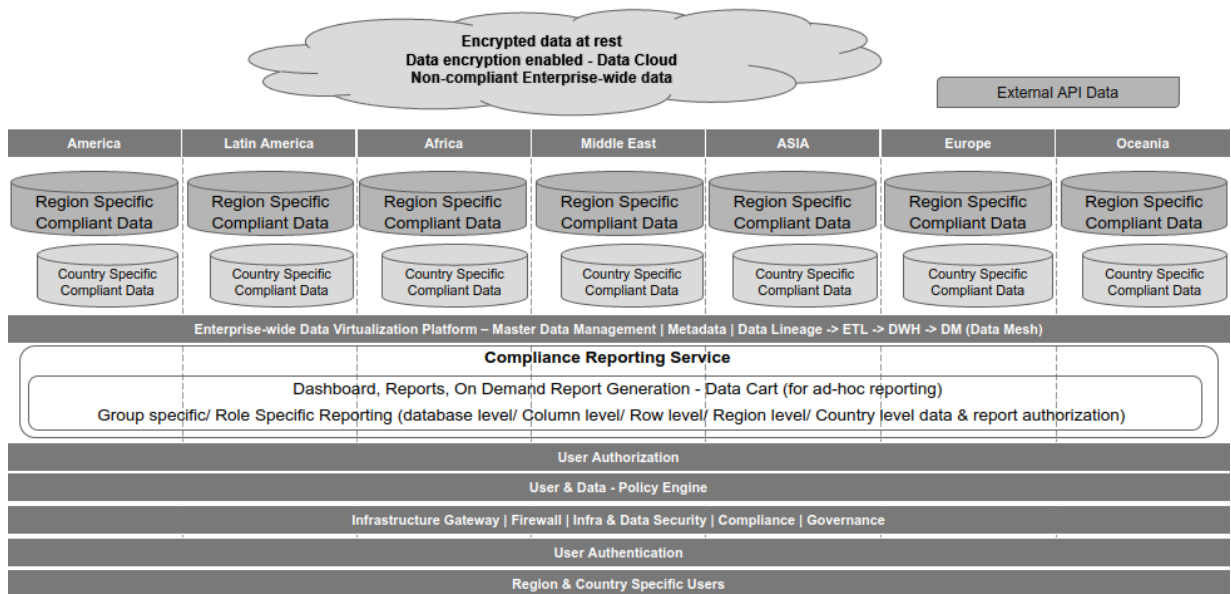


Figure 2: Data Compliance – Data Virtualization Platform Architecture

Tools and technologies involved in Data Virtualization Platform

On-premise databases: Oracle, SQL server, Big Data, PostgreSQL, IBM DB2...

Un-structed/ No SQL databases: MongoDB, Cassendra, DynamoDB, Hbase...

On-premise ETL tools: Informatica, IBM Datastage, talend, Oracle integrator, Pentaho...

Cloud databases: Snowflake, Azure bds, GCP dbs, AWS dbs, DataStack...

Gateways & Firewalls technologies

CICD pipelines: Jenkin, Git, Maveen...

BI tools: Power BI, Tableau, Qlik, Tibco Spotfire...

Data virtualization platforms

- | | |
|-----------------|---------------------------------|
| Actifio | Actifio Virtual Data Pipeline |
| AtScale | Intelligent Data Virtualization |
| Adata | CData Driver Technologies |
| Datameer | Datameer Spotlight |
| Data Virtuality | Data Virtuality Platform |
| Denodo | Denodo Platform |

IBM	IBM Cloud Pak for Data
Informatica	Informatica PowerCenter
Oracle	Oracle Data Service Integrator
RedHat	Red Hat JBoss Data Virtualization
SAP	SAP HANA
SAS	SAS Federation Server
Stone Bond	Stone Bond Enterprise Enabler
Tibco	TIBCO Data Virtualization
Delphix	Delphix DevOps Data Platform
Vmware	VMware vCloud Director
AWS	AWS Glue

CONCLUSION

Data compliance - data virtualization framework can provide significant benefits to organizations, including manage their compliance obligations, manage risk, improve efficiency, gain competitive advantage, and continuously improve their compliance practice process, reduced risk of legal and regulatory penalties, increased customer trust and loyalty, improved data security, enhanced reputation and brand value, and increased operational efficiency. By implementing a data compliance framework using data virtualization technologies, organizations can ensure that they are operating within legal and regulatory requirements confined by regulatory authority, and are well positioned to achieve their organizations objective by utilizing local and global data sets. Data virtualization can play an vital role in data compliance by providing a flexible, robust and scalable approach to managing and protecting sensitive data. By leveraging data virtualization technology, organizations can enhance data security, data masking, data lineage, data quality, and compliance reporting.

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Abbreviations

DCIA	Digital Charter Implementation Act	
PDBD	Personal Data Protection Bill	India
PPA	Privacy Protection Authority	Israel
PPI	Protection of Personal Information	Japan
LGPD	Lei Geral de Proteção de Dados	Brazil
PIPL	Personal Information Protection Law	China
EDPB	European Data Protection Board	EU
GDPR	General Data Protection Regulation	USA
CCPA	California Consumer Privacy Act	USA
POPIA	Protection of Personal Information Act	South Africa
PIPEDA	Personal Information Protection and Electronic Documents Act	Canada
NIST	National Institute of Standards and Technology	
HIPAA	Health Insurance Portability and Accountability Act	
CCPA	California Consumer Privacy Act	USA
PCI DSS	Payment Card Industry Data Security Standard	USA
SOX	Sarbanes-Oxley Act	USA
FedRAMP	Federal Risk and Authorization Management Program	
SHIELD	Stop Hacks and Improve Electronic Data Security	
CMMC	Cybersecurity Maturity Model Certification	

Impact of Covid-19 on Training and Development

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Abstract— *This research paper explores how training and development in the field of Human Resource Management (HRM) has been impacted due to COVID-19. For this a hypothesis testing using chi-square test was conducted to understand whether skill development working from home is dependent on preference of training. Post analysis the hypothesis was tested to be affirmative viz. there is an association between the two variables mentioned above. Along with the hypothesis testing, a reliability test using Cronbach's Alpha was conducted. It proved that the couple of cases taken for testing were reliable and significant. The data collection is based on primary as well as secondary data collected by the researchers. A study through a questionnaire was administered and the analysis was inferred in the case of primary data. In the case of secondary data, data was collected from business papers and through authorized sites over the internet. The study explored to prove the alternate hypothesis, which eventually led to the null hypothesis being accepted. The data collected was from 44 sample and is a quantitative study as well as qualitative type.*

Keywords: *COVID-19, Training and Development, Skill development, preference of work, work from home*

INTRODUCTION

Among the various disciplines of management, Human Resource Management (HRM) plays a major role in the effectiveness of any organisation. Human Resource Management is the process which starts with the Recruitment and ends with Employee Retirement. There are many functions which are done by HRM department viz, Recruitment, Selection, Employees Induction, providing orientation, Imparting Training and Development, Performance Appraisal, Management of Compensation and benefits, Employee Motivation, maintaining good Human relations and their trade unions, ensuring employees safety, welfare and healthy measures in compliance with labour laws. Among the aforesaid functions done by HRM department, providing Training and Development to the Employees is one of the key functions of HRM. Training & Development (T&D) plays

a vital role in enhancing employees' performance and increases productivity thereby results in organizational effectiveness. Organizations needs to consider the cost, time and effort involved in T&D activities as an investment rather than cost.

Training is the process for providing required skills to the employee for doing the job effectively, skilfully and qualitatively. Training of employees is not continuous, but it is periodical and given in specified time. Generally training will be given by an expert or professional in related field or job.

Development is concerned with the growth of employees in all respects. It is the process by which managers or executives acquire skills and competency in their present jobs and also capabilities for future tasks. The purpose of development is imparting advanced knowledge and competencies among the employees.

Coronavirus disease 2019 (COVID-19) is defined as illness caused by a novel coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV), which was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China.

Due to COVID-19, lockdown was imposed in March 2020 in India which led to offices being shut down and people starting to work from home. As far as training is considered, offline training and on-the-job training was not possible due to the pandemic and lockdown. This led to virtual training of not only current employees or interns, but also of new employees and interns.

OBJECTIVES:

1. To understand what kind of training is preferred by the interns and employees – On the job training or Off the job training
2. To understand whether virtual training due to COVID-19 is effective or not, and to what extent it is effective.
3. To identify which areas have been most affected due to online training due to COVID-19 – Personal

interaction, Communication, Motivation, or On the job training experience.

4. To identify which are the most faced issues due to online training in COVID-19 pandemic – Fixed timing, Network issues, or Electricity issues.
5. To know whether the interns and employees are having better skill development while working from home.
6. To know what kind of skills need improvement which can be developed through virtual means.

REVIEW OF LITERATURE:

Lin Grensing-Pophal (2020) described the idea that the post-COVID world will be a significantly different “new normal” relative to the pre-COVID world has become cliché, but that doesn’t make it any less true. For a variety of reasons, many companies have been averse in the past to embracing remote and on-demand training solutions. One common apprehension is that these formats can’t mimic the engagement of live, in-person training. But with virtually all in-person activities shuttered for months, organizations have been forced to shift training and other activities to remote and on-demand formats or else simply not have them at all. Many are realizing that the drawbacks of these formats are not as bad as they may have feared.

Hilliard, Ann Toler (2015) describes blended learning as a combination of online and face-to-face activities for classroom instruction or other training modalities to help develop new knowledge and skills that can be transferred to the workplace environment. The use of blended learning is expanding globally. Blended learning is evident in professional development training and general classroom offerings for a number of educational programs across disciplines in global communities. With the limitation of funding and time constraints, more professional development training organizations, programs in departments and units at universities and colleges are infusing blended learning as another educational tool to use in the delivery of instructional and managerial services. Blended learning is a fast growing trend in traditional institutions in higher education and other organizations. An Online Learning Survey revealed that blended learning was expanding globally to the growth rate 46% or higher per year.

Snezana Jokic et al (2012) explained E-training, i.e. training of employees in corporations and SMEs through e-learning has become a commonly applied training procedure in today’s world because it allows the training of employees from different departments within different

locations throughout the country. Employers currently use e-learning for the introduction and retention of employees, accelerating the training time and assessing staff to new procedures or products, to connect with their supply chains and distribution, the distribution of the workforce and to close the gap in training between different companies and industries.

RESEARCH METHODOLOGY:

The present research is based on primary data and as well as secondary data. In order to get the primary data, structured questionnaire was prepared online. The following research framework was adopted for the completion of the study. Along with primary data, secondary data which is online was used. Secondary data included data from business newspapers such as Financial Express, Economic Times, Business World and many more.

HYPOTHESIS

Primary data was collected for data analysis on the hypothesis which was framed as below:

H0: Skill development working from home is dependent on preference of training

H1: Skill development working from home is not dependent on preference of training

An exploratory approach is used to validate the research hypothesis and answer the following six questions:

1. Which type of training is preferred?
2. Effectiveness of virtual training
3. Areas in training affected due to COVID-19
4. Issues faced due to online training
5. Skill development through work from home
6. Skill improvement through virtual means

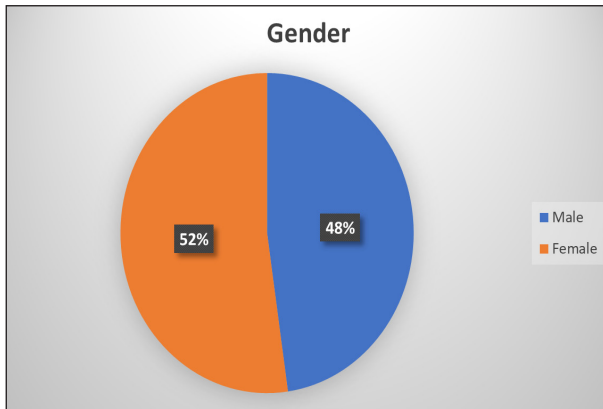
The study is quantitative as well as qualitative in nature. An exploratory approach was used in the form of a survey to understand the impact of COVID-19 on Training and Development. The target audience was that of interns as well as employees working at WisdomReady EduFin Services LLP. Most of the respondents were interns as compared to employees.

Quantitative study was done using Google Forms and was shared across all interns and employees working at WisdomReady EduFin Services LLP. The survey was conducted from 1st of August, 2020 till 11th of August, 2020. A total of 44 responses was recorded in basically two age groups viz. 18-30 and 31-40. As most of the

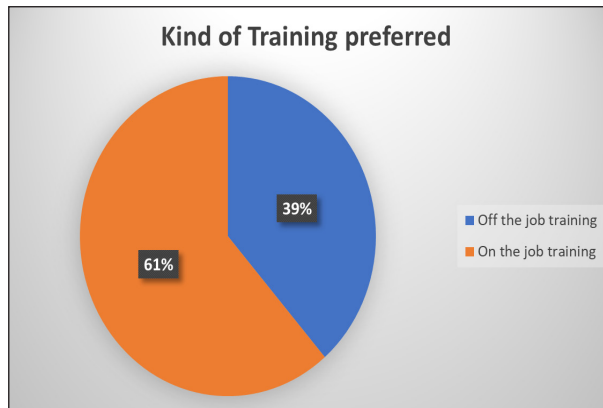
respondents were interns, it is obvious that there were more respondents in the age group 18-30 as compared to those respondents in the age group of 31-40.

DATA ANALYSIS:

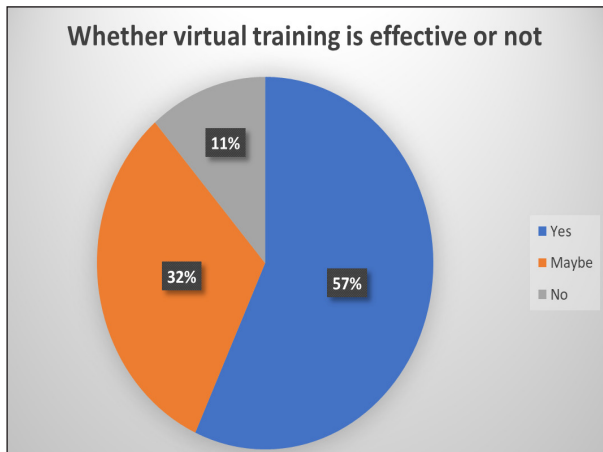
Gender wise distribution



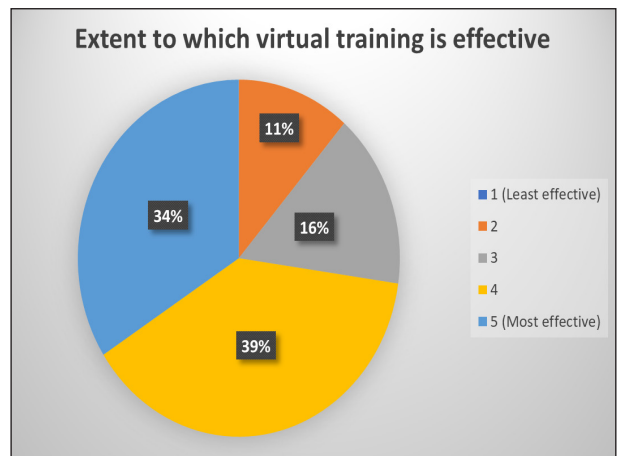
Kind or type of training preferred



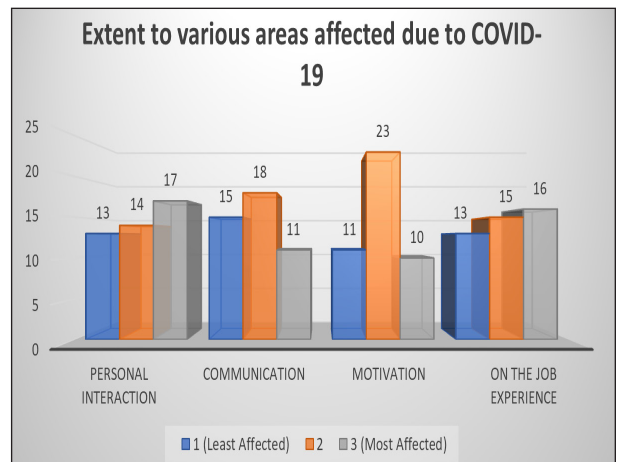
Is virtual training effective or not?



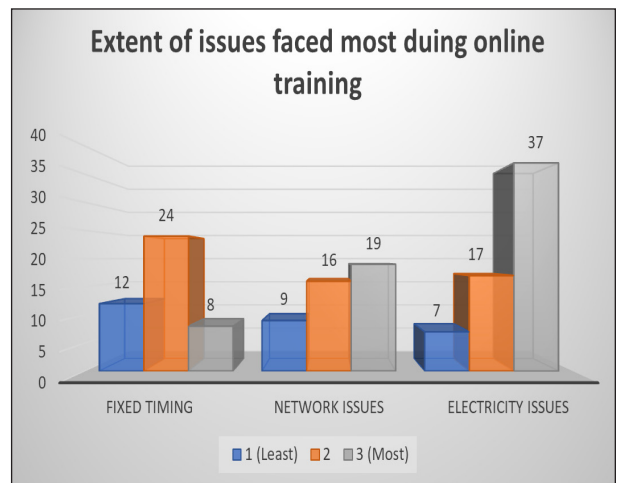
The extent to which virtual training is effective



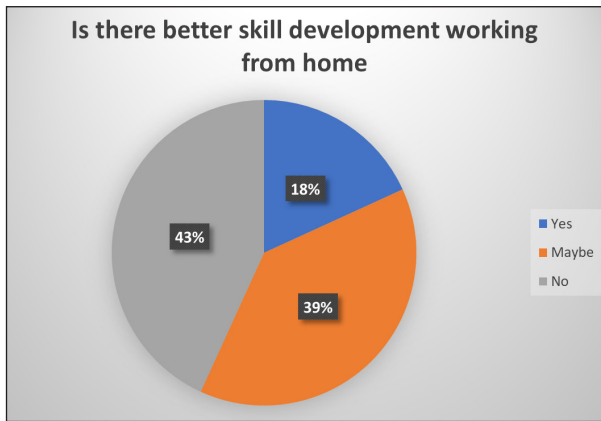
Extent to areas affected due to virtual training during COVID-19



Extent to issues faced most due to virtual training during COVID-19



Is there better skill development working from home



Chi-Square Test

Status	O	E	O-E	O-E ²	O-E ² /E
On the job training and Yes	6	4.909091	1.090909	1.190083	0.242424
On the job training and Maybe	12	10.43182	1.568182	2.459194	0.23574
On the job training and No	9	11.65909	-2.65909	7.070764	0.606459
Off the job training and Yes	2	3.090909	-1.09091	1.190083	0.385027
Off the job training and Maybe	5	6.568182	-1.56818	2.459194	0.37441
Off the job training and No	10	7.340909	2.659091	7.070764	0.9632
Total					2.80726

H0: Better skill development through work from home is dependent on preference of training

H1: Better skill development through work from home is not dependent on preference of training

DF 2

LoS 5%

p-value 0.833

Chi-square value 2.807

$0.833 < 2.807$

H0 is accepted

Reliability with Cronbach's Alpha:

Cases	Cronbach's Alpha Reliability Value
Areas of training affected due to COVID-19	0.7944
Issues faced due to Online training	0.7019

In the view of the above, we conclude that the data is significantly reliable and can be used for final analysis.

DATA INTERPRETATION:

Analysis of Survey Details

- As this report is on the study of impact of COVID-19 on Training and Development, one important point to be analysed was which kind of training is preferred among the respondents. From the analysis it is understood that 27 out of 44 respondents viz. 61% prefer On-the job training. This is because on the job training gives you more exposure to the actual experiences needed to do the job than off-the job and online training.
- Another point to be noted that as during COVID-19 period viz. basically related to the lockdown period to be precise, as training was to be made online or virtual, an opinion on the effectiveness of virtual training was taken where 57% agreed to the fact that virtual training is effective, 32% were not sure and rest 11% disagreed completely that virtual training is effective.
- When we continue from the above point about effectiveness of virtual training, the extent to which virtual training was asked for to be analysed. From the results, it is understood that 73% of the respondents feel more and more affirmation towards the effectiveness of virtual training whereas, only 16% are neutral and only 11% are slightly hesitant towards accepting the fact that virtual training is effective. No respondent agrees that virtual training is not at all effective or least effective to be precise. This shows that virtual training is not only the need of the hour today, but also widely accepted to the fact that it is effective.
- Next thing that needed analysis was the areas affected in training and development due to COVID-19. For this, four areas of training and development was taken into consideration. They were Personal interaction, Communication, Motivation, and On-the-job experience. The extent to which these areas have been affected was analysed. From the data collected, it is understood that the most affected area in training and development due to COVID-19 is Personal interaction, and closely next is On-the-job experience. This has to be true because personal interaction gives a feeling of belongingness for both the trainer and the trainee or employee. On-the-job experience or training makes the trainee or employee more to-be job-fit. The least affected area out of the

four is communication. This is quite obvious as be it an online or virtual training or be it on-the-job training, communication is going to be maintained for smooth functioning of any organisation.

- Now coming to the issues faced in online training due to COVID-19 were categorized into three areas viz. Fixed Timing, Network issues, and Electricity issues. From the survey data it is understood that most of the respondents face electricity issues and network issues the most. This leads to disturbance in training and becomes futile and ineffective in the long run. Least faced issue out of the three is fixed timing. Even- though timing of in-office and work from home timing are the same, due to flexibility in the comfort of one's own space at home has not been an issue whatsoever. Due to this flexibility in workspace irrespective of fixed timing, it has not affected online training as it is a part of your job.
- Coming to whether there is better skill development of employees and/trainees working from home, 43% were against the fact that there is better skill development working from home and 39% of the respondents are not sure of the same. This shows how skill development cannot work much when it comes to a work-from-home culture. There are few reasons to actually be precise. They are - lack of proper resources needed for a work culture when we compare against a work-from-home culture and a work-from-office culture. Next reason is that there is no proper personal interaction and motivation too. Another reason can be that there is a difference in mindset or psychological change in the minds of the people due difference in an office environment and a homely environment. A homely environment makes the employee/trainee/intern interest to work fall drastically as there are various distractions from all corners.

Analysis of Chi-Square Test

- The null hypothesis by default was taken as Better skill development through work from home is dependent on preference of training, and alternate as Better skill development through work from home is not dependent on preference of training
- It is a dependence or association-based test
- Skill development happens can happen in office mode or in online or virtual mode. Through the charts it was understood that work from home online training was taken negatively.

Analysis of Cronbach's Alpha

To test the internal consistency of the data, Cronbach's alpha value was computed. Items considered for reliability were questions under each section of issues of COVID-19 on Training and Development questionnaire. High values of Cronbach's alpha indicate high internal consistency of multiple items measuring each construct, thus suggesting high reliability of the individual construct. The reliability coefficients of more than the cut-off value 0.7 is recommended as acceptable.

CONCLUSION:

This dissertation studied how COVID-19 has affected Training and Development of interns and employees working at WisdomReady EduFin Services LLP. Preferences of whether On-the-job training or Off-the-job training is effective was taken into consideration and it could be concluded that 61% of them prefer On-the-job training. Personal interaction is the most affected area in Training and Development as interaction among people for better psychological feel is missing due to COVID-19. Electricity issues and network issues are most faced issues by the respondents as people are working from different parts of the country and some of the respondents as they stay in villages face electricity issues and network issues more often than not.

Overall it can be concluded that On-the-job training is most effective as people are missing the interaction and socializing part and are also getting irritated due to electricity and network issues which is not leading to required Training and Development of interns and employees.

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To Identify the Untrustworthy Leader of a Hierarchical Wireless Sensor Network Using Received Signal Strength

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Abstract— *There are a multitude of privacy and safety concerns that arise as a result of wireless sensor nodes being carelessly put in potentially hazardous regions. An adversary has the capability of either seizing a node that is located in an area that is not under their control or introducing a node that is acting under the guise of a genuine node. The lack of adequate security in sensor networks presents a substantial barrier to many potential applications. A form of protection known as intrusion detection can be utilized to thwart attacks of this nature. Because of this, traditional methods of intrusion detection cannot be utilized in a sensor network due to the restricted resources of individual nodes. In this paper, we offer a method for detecting intrusions in hierarchical wireless sensor networks using a sensor fusion algorithm. This method is intended to be utilized in situations in which malevolent nodes are performing the duties of Cluster Head. Clustering is an approach that sensor networks take in order to produce their detections. A technique that only requires a modest amount of communication yet is nevertheless capable of thwarting an attack on a hierarchical routing system has been described.*

Key Words: Wireless Sensor Network, Security, LEACH, Malicious Node, RSS, Hello Flood attack

1. INTRODUCTION

Over the course of the past few years, wireless sensor networks (WSNs) have steadily risen to the status of one of the most interesting and potentially fruitful fields. This network is made up of a vast number of minuscule sensor nodes, each of which possesses a constrained amount of power, bandwidth, memory, and processing capabilities [1]. Because sensor nodes have their own built-in restrictions, the network may become more susceptible to errors and malicious attacks as a result. The open wireless medium, the unstable communication channels, and the limits of resources in radio range, processing speed, memory, and power make it difficult to implement security mechanisms in WSN [2].

Because of its straightforward architecture, the WSN device can be compromised in a variety of different ways. Despite the use of encryption and authentication, malicious actors are still able to monitor and manipulate the communication that passes via WSNs. To make matters even worse, it is exceedingly difficult to defend sensor nodes from physical attacks in hostile unattended situations. This is due to the fact that nodes can be physically shifted, damaged, or tampered with through direct physical access. Attackers on WSN have been categorized, according to Roosta et al. [3]. Wood [2] discusses potential DoS attacks that could be launched against WSNs. Finding novel security solutions that are appropriate for node design and protocols is the primary problem faced by researchers working in this area of the field. This security system should be able to identify intruders with a minimum amount of communication by detecting any abnormal behaviors exhibited by sensor nodes. owing to the fact that wireless communication is the primary driver of energy usage [1]. Misbehaviors may be displayed by a node whenever a problem occurs or as the result of malicious activity by sensors that have been exploited [4]. By evaluating the activity of the nodes, it is possible to identify inappropriate activities in any scenario.

Karlof [5] has presented a comprehensive examination of the vulnerabilities that are present in the routing of WSNs. According to the findings of their research, standard protocols for sensor networks are insecure because of their inherent simplicity. Most proposed routing algorithms for sensor networks do not consider security because of the limited capabilities of sensor nodes. Because sensor networks are subject to a different set of criteria than standard wireless ad hoc networks, the routing in these networks also operates differently [6].

In reference number [7], a comparison is made between the Comparative Received Signal Strength (CRSS) Algorithm and the vector algorithm to determine which one is superior for the task of indoor localization. Therefore has been demonstrated that the superior

performance of the vector algorithm can be attributable to the aforementioned parameters. This is because CRSS is ambiguous, and it requires a bigger number of access points as well as a higher working frequency. A variant of the k-nearest Neighbor technique that is based on the signal matching approach has been developed in [8]. This variation was evaluated using a single test case, and the results showed that it offered an improvement in accuracy.

However, range-based techniques determine an estimate of the distance that separates each pair of nodes by approximating the gap. Global Positioning System (GPS) [9], time difference of arrival (TDoA) [10,11], time of arrival (ToA) [12], acoustic energy [13], angle of arrival (AoA) [14], and received signal strength indicator (RSSI) [15] are the range-based approaches that are utilized for estimating distance the most frequently. However, despite its high cost, additional hardware requirements, and significant energy consumption when applied for LoS applications in the vast outdoors, GPS is still the most preferred alternative. In addition, such applications are not encompassed by the scope of the WSNs that were taken into consideration for this research. When doing TDoA-based distance measuring, synchronization across the various nodes that are essential is of the utmost importance. This is a very inefficient approach in terms of both the amount of energy it consumes and the amount of money it costs, as it requires two signals to be delivered at different speeds in order to achieve synchronization. In a similar line, accurate ToA calls for clocks that have a high resolution in addition to their precision. In addition to this, it is necessary to have an accurate figure for the speed at which signals are transmitted. Because AoA is a directed method for determining the distance between two points, it requires a more expensive antenna to capture the incoming signal from a particular direction. In this study, RSSI-based localization will be used to complete the task of localizing target nodes because of its independence from the antenna array, synchronization requirements, and any other ancillary gear.

The received signal intensity at a node is influenced both by the power of the signal that was broadcast and the terrain of the path that the signal took. This effort will take into account the possibility of path loss as well as node separation [16]. Path loss can be caused by a number of different phenomena, including signal reflection, diffraction, and scattering [17]. Along the path that the signal takes as it is propagated, there is also some attenuation that occurs. The received signal strength indicator, also known as RSSI, is a metric that represents, in decibels, the strength of a signal at a particular node. There are a number of factors, including

the relative motion of the transmitter and/or receiver, that have the potential to influence the RSSI [18,19,20] at a particular node. It is essential to keep in mind that the RSSI can be impacted at any time by the movements of items in the propagation environment [21,22], even if the devices themselves continue to remain stationary. This is something that must be kept in mind. It is difficult to construct a straightforward linear relationship between signal distance and node distance since RSSI depends on a number of different variables simultaneously. Therefore, a methodical and accurate strategy is required in order to calculate the distance between undiscovered nodes and locate their locations. The localization of a target node is essential for figuring out which path through a network will take the least amount of time and will deliver a data package to its destination.

The focus of this work is on attacks that are made against hierarchical routing protocols used in WSNs. In this architecture, some of the nodes were responsible for processing and sending information to the Base Station (BS) in the form of Cluster Heads, while the others were in charge of performing the sensing. As a result of CH's ability to aggregate and fuse the sensed information of its members and serve as an intermediary router to BS, The function of CH is significantly more significant than that of other nodes. If hostile nodes operate as CHs, it has the potential to disrupt the operation of the entire network [5]. The detection method that was proposed placed an emphasis on this susceptible point of security for hierarchical WSN and built a detection approach for a CH when it behaves in an unusual manner.

The remaining parts of this work are structured as described below. In the following section, clustering strategies for hierarchical routing protocols are discussed. In Section 3, we discuss the security breach as well as the work that is directly tied to it. Proposed detection mechanism detailed in part 4. The simulation will be presented in full in this section, and the findings will be discussed. In section 6, we will explore the findings and compare them to other work that is closely related. In the seventh and final section, we will offer some concluding thoughts.

2. CLUSTERING TECHNIQUE OF WSN

The formation of clusters in WSN is typically determined by the energy reserves of the sensors and the proximity of the sensors to the CH. LEACH [23] is the first hierarchical routing approach for WSNs. In this approach, a small number of sensor nodes are chosen at random to function as CHs. The remaining nodes all connect to one of these CHs. LEACH is entirely decentralized and does not call

for any familiarity with global network architecture. In LEACH, the role of CH is shared among the nodes on a rotating basis in order to ensure that the energy load is evenly distributed after each predetermined time interval. The methodology behind this method of clustering is referred to as dynamic clustering [23]. The operation of LEACH is split into two phases: i) the setup phase, during which CHs are chosen and clusters are organized; and ii) the steady state phase, during which sensing data are transmitted.

During the setup phase, certain nodes will choose to act as CHs, at which point they will broadcast an advertisement to the remaining nodes. A node will choose its cluster leader based on the received signal power of the advertisements it has received from CHs after it has received those CHs' advertisements. The node will then send a message to the CH it has targeted with the correct ID. On the other hand, a CH will only begin the process of creating its cluster if it has received messages from nodes that are interested in participating. After the cluster has been formed, the individual nodes that make up the cluster will start to sense and relay data to the CHs. The CH is responsible for aggregating or compressing the data of its members before sending it to the BS.

In PEGASIS [24], each node broadcasts a power signal to its neighbors, and then gradually decreases the strength of the signal until it is only received by a single node, identifying that node as its nearest neighbor. After that, every node will only connect with its immediate neighbor and will take turns transmitting data per round. Each node in the network combines the data it has acquired with its own data, and then uses multihop transmission to send the combined set of data to the next node in the network. This process replaces the formation of cluster leaders, which is done in LEACH. The TEEN [24] algorithm, which is an improvement upon the LEACH algorithm, enables reactions to extreme and abrupt changes in the network. The clustering method is comparable to LEACH in that it also considers the strength of the received signal. Therefore, the signal strength that a CH receives from a WSN cluster is the most crucial attribute to consider while constructing a WSN cluster.

3. SECURITY BREACH AND RELATED WORKS

Karlof [5] describes two hypothetical attacks that can be used against hierarchical routing protocols used in WSN: the HELLO Flood and the Selectively Forwarding. It is a requirement of many protocols that nodes announce themselves to their neighbors by broadcasting HELLO packets. A node that receives such a packet may believe

that it is within normal radio range of the sender of the packet. An attacker can carry out a HELLO flood attack by broadcasting routing or other information with sufficient transmission power to persuade every node in the network that the adversary is one of its neighbors. When a node chooses an enemy node as part of its message route, the malicious node may either operate as a black hole by refusing to forward any of the messages it receives or it may selectively forward some messages to the wrong receiver while dropping the rest. In this study, we discuss the security vulnerability that occurred with the hierarchical routing protocols, and we suggest a detection system that is based on the received signal strength [26].

This is the first time that Junior et al. [27] offer a technique for detecting rogue nodes based on the signal intensity of sent messages. He mulled over the possibility of utilizing a geographic routing technique in which every node knows its position using GPS or another positioning technology. This work has a good amount of success in detecting malicious nodes. The fact that each node must obtain information about its position from the surrounding nodes is a drawback of this approach. J. Wang et al. [28] suggested a method to detect Sybil attacks based on RSS, paired with additional characteristics such as the nodes' ID number, position information, and nodes' power value, etc. The routing technique utilizes a hierarchical structure. M. A. Hamid presented a protection mechanism against the HELLO flood assault in [29]. The HELLO flood attack is defended against in this work by the introduction of bidirectional verification and multi route routing using a shared secret across sensor nodes. Each node in this network is able to compute a pairwise key using the shared secrets. The process of key production and distribution is the primary focus of this piece of art.

4. PROPOSED DETECTION TECHNIQUE

In this section, the method for detecting suspicious CH that conducted attacks through the clustering technique of hierarchical wireless sensor networks is described.

4.1 Network Model

We are going to make the assumption that WSNs are static, homogenous (meaning that all of the nodes have the same hardware and software), and symmetric (meaning that node A can only connect with node B if and only if node B can communicate with A). The initial configuration of each node is the same [27]. (e.g., energy, transmission power, antenna height and antenna gain). Within this sensor area, they are able to identify each individual node thanks to their IDs. The Two-Ray Ground Model is used to describe the propagation of radio waves (Eq. -1).

$$P_r = \frac{P_t \times G_t \times G_r \times h_t^2 \times h_r^2}{L \times d^4} \quad (1)$$

In equation-1, P_t and P_r are transmitted and received power, G_t and G_r are Antenna Gain of the transmitter and receiver, h_t and h_r are Antenna Height of the transmitter and receiver, L is the system loss factor not related to propagation and d is the distance between transmitter and receiver [30]. It is assume that a node can be easily measure signal strength of a received signal. All nodes transmit packets with same power P_t to other nodes otherwise inform to recipient about transmitted power. Communication pattern within a cluster is single-hop and CHs to BS may be multihop depends on distance between them.

In addition to this, we take into consideration the fact that a node cannot be corrupted within a given amount of time after its deployment. Because when a person or agent deploys nodes in a sensor field, an adversary is unable to capture or tamper with any nodes on her presence without being detected. During this period of time, tm nodes will send a HELLO message to all of their neighbors in order to compile a database of neighbors that will be known as the neighbor database. It consists of at least two fields, which are the Node ID and the Received Signal Strength (RSS) when it comes to receiving messages from its neighbors (fig. 1). A node will need a few seconds in order to construct a neighbor database [31]. The behavior of a node is considered abnormal if the node gets any message from its neighbors with a higher signal power than the value in the neighbor database. It is possible for a foe to seize control of this node and use their superior transmission power to win over further nodes. The clustering procedure will continue once tm has passed. A CH or elect status can be declared by a node using a manner similar to that used in LEACH [23]. A node may check the transmitted power of any other node within its radio range by simply sensing the wireless medium; this is because the wireless medium is broadcast in nature.

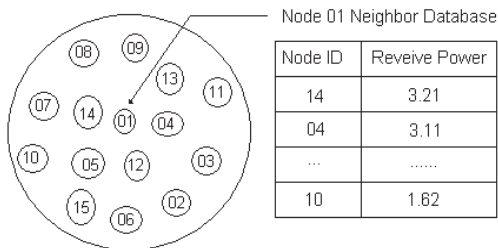


Fig. 1 All of node-01's radio-neighboring nodes, together with the neighbor-database they generate automatically at tm.

4.2 Trust Model

When evaluating the reliability of this detection method, we consider the following trust factors [27] [28]:

- The base station is stored in a secure location, so that it cannot be tampered with in any way.
- BS is the authority and controller of all activities that take place within WSN, and it does not have any resource limitations.
- There are no trust requirements placed on sensor nodes despite the fact that they are vulnerable to node capture threats. The BS is the authoritative source for any authentication and decision.

4.3 CH Detection Technique

We make the assumption that an adversary is capable of seizing a valid node or introducing a node with the correct ID. We look at two different methods of clustering: the dynamic clustering [23] methodology and the fixed clustering technique. In fixed clustering, the CH property of a node will not be altered until either the CH has died due to a lack of power or an administrator modifies the CH property. The following is how the proposed detection technique for dynamic clustering actually works:

When a node receives CH advertisement from one or more nodes, the node will first validate the node ID and signal strength of the advertisement with its neighbor-database. If the node ID is already stored in the database, then it will compare the strength of the advertisement signal to the database of its neighbors. It is a sign of inconsistency if the node observes that the CH advertisement has sufficient power beyond the permitted range. Since there is no movement among the nodes, and each node always transmits packets with the same power P_t , as explained in section 4.1. The irregularity in the propagation of radio waves is to blame for any slight differences that may exist.

If the currently acquired signal strength is lower than the value in the neighbor database, then it is considered acceptable. On the other hand, if it is sufficiently large, the node needs to determine whether or not it is acceptable. The permissible power ratio is defined by us as ((present RSS - neighbor-database RSS) / neighbor-database RSS). If one node discovers that another node within its radio range is transmitting at higher signal intensity than usual, then this must be considered an anomaly. It is validated by the node using the information from other nodes.

The node will check the inconsistency of that CH by sending a message to all of its adjacent nodes. It provides a counterpoint to support the inconsistent behavior of the neighbors. The node was referred to as the sending node. The value of the counter increases whenever a supporting

reply message that is called a supporting-message from neighbors is received. Because a radio receiver may detect high power from a sender due to some imbalance in the transmission hardware or irregularity in the propagation of radio waves or both, we take into consideration this form of verification from neighbors. The voting method reduces the amount of times that a false detection is made, as demonstrated in [32] and [33]. If the majority of nodes in close proximity to CH are able to detect a high transmission power from CH, then we can safely say that this is an abnormality.

Any suspicious behavior exhibited by a node ought to be picked up locally by the members or neighbors of a CH given that the technique for cluster formation is local. If the sending-node counter value is more than a certain threshold, also known as the suspicious threshold, it broadcasts to the other nodes the information that the CH is potentially malicious. The node communicates with the BS by sending a message concerning the suspicious behavior of the CH.

In the method known as fixed clustering, randomly selected member nodes of a cluster check the CH transmission power at regular intervals after being organized into a cluster. A random number r is produced by each node after a period of time that has been determined. If r is greater than r_{th} , which is referred to as the random threshold, a node will only verify the CH power it possesses. When a node makes the decision to check the CH power, it does so by sensing the wireless medium and determining the strength of the signal sent by its CH. The current value of CH signal power is evaluated by the node and compared to the database of its neighbors. If the node detects that the received signal intensity from CH is now greater than the permissible power ratio, it will broadcast a message to all of its neighboring nodes requesting that they check the power supplied by CH. It enables a supporting-message counter for its neighbors to use. Only the nodes that are part of the same cluster as you will check the CH transmitting power of your neighbors; the remaining nodes will ignore the message. When the counter value of the node goes beyond the suspicious threshold, a notice is sent to the BS as well as the other nodes.

Algorithm for neighbor–database of a node:

- Step 1: A node sends Hello message to all its neighbors with its ID.
- Step 2: The nodes within radio range reply with their ID.

- Step 3: Node creates a table of neighbors for every received message with Node ID and signal strength of the message.

Algorithm for dynamic clustering:

- Step 1: When a node n receives CH advertisement it checks this node ID and signal strength of the advertisement with neighbor–database.
- Step 2: If the CH Node ID in its neighbor–database and signal strength of the CH advertisement within acceptable power ratio, do nothing.
- Step 3: If node n detect CH signal power more than acceptable power ratio, send message to all neighbors to check the CH power.
- Step 4: n set a counter to count for supporting message.
- Step 5: Nodes within radio range of n check this CH power if it receives any message from this CH, otherwise ignore the message.
- Step 6: If any neighbor node finds CH transmitted power exceeds acceptable power ratio, it sends a packet to node n , otherwise send nothing.
- Step 7: n increases its counter after receiving of each message. When the counter value exceeds suspicious threshold, it informs other nodes and BS.

Algorithm for fixed clustering:

- Step 1: After each time interval t_i , all nodes generate a random number r . Nodes (n_1, n_2, \dots), whose value of r greater than r_{th} , checks their CH power.
- Step 2: If a node (say n_1) detects signal power of its CH is greater than acceptable power ratio, it broadcast this to all neighbors.
- Step 3: n_1 open a counter to count for supporting message from neighbors.
- Step 4: Neighbor nodes, which are member of n_1 –cluster, check their CH power otherwise overlook the n_1 message.
- Step 5: If a member node finds that CH transmitting power greater than acceptable power ratio, it sends a message to n_1 , otherwise send nothing.
- Step 6: n_1 increases the counter after reception of each supporting message.
- Step 7: When the counter value exceeds suspicious threshold, it informs other nodes and BS.

Figure 2 (a), (b), and (c) depict the pseudo code for the suggested approach (c).

```

for node  $n$ :  $i$  to  $N$ 
    send Hello_Msgi to all  $n$ ;
    open neighbor-database $n_i$ ( $DB_{n_i}$ );
    for node  $j$  to  $N$  ( $j \neq i$ )
        if node  $j$  receive Hello_Msgi
            send Hello_Msgj to  $i$ ;
        end if;
        measure  $RSS_j$  of Hello_Msgj;
        insert value of  $j$  and  $RSS_j$  in  $DB_{n_i}$ ;
    end for
end for

```

Fig 2(a) Pseudo code for neighbor database

```

if node  $n_i$  receive CH_ADV of node  $n_j$ 
    check  $j$  and  $RSS_j$  in  $DB_{n_i}$ ;
    if ( $j \in DB_{n_i}$ )
        if ( $RSS_j > RSS_j(DB_{n_i})$ )
            if (check  $RSS_j > acceptable\_power\_ratio$ )
                open a counter  $c_i$ ;
                send Msg_susj to all neighbor;
                for all neighbor  $n$ :  $k$  to  $m$ 
                    if ( $n_k$  receive CH_ADV of node  $n_i$ )
                        if (check  $RSS_j > acceptable\_power\_ratio$ )
                            send Msg_susj to node  $n_i$ ;
                        end if
                    end if;
                    increase  $c_i = c_i + 1$ ;
                end for;
                if ( $c_i \geq suspicious\_threshold$ )
                    send Msg to BS and other nodes about  $n_j$ ;
                end if
            end if
        else
            start clustering process;
        end if
    end if
    if ( $j \notin DB_{n_i}$ )
        send Msg to BS and other nodes about  $n_j$ ;
    end if
end if
end if

```

Fig 2(b) Pseudo code for dynamic clustering

```

node  $n_i$  open a time counter  $t_n$ 
 $t_n > time\_interval$   $t_i$ 
    generate random number  $r$ ;
    if  $r > r_{th}$ 
        check  $CH\ RSS_{CH}$ ;
        open a counter  $c_i$ ;
        if ( $RSS_{CH} > acceptable\_power\_ratio$ )
            send Msg_susCH to all neighbor;
            for all neighbor  $n$ :  $k$  to  $m$ 
                if ( $n_k \in CH$ )
                    if (check  $RSS_{CH} > acceptable\_power\_ratio$ )
                        send Msg_susj to node  $n_i$ ;
                    end if
                else
                    do nothing;
                end if;
                increase  $c_i = c_i + 1$ ;
            end for;
            if ( $c_i \geq suspicious\_threshold$ )
                send Msg to BS and other nodes about  $n_j$ ;
            end if
        end if
    end if
end if

```

Fig 2(c) Pseudo code for fixed clustering

5. SIMULATION DETAILS AND RESULTS

During simulation, the parameters of Mica2 [34] and its radio chip CC1000 [26] are utilized. They are detailed in Table 1 below. If the signal power of the packet is less than the receiver sensitivity, also known as the **receiver threshold** P_{Th} [26], a node won't be able to receive any packets sent by other nodes. We are working under the assumption that the nodes are distributed throughout the sensor field in a random manner. Every node decreased their transmission power (P_t) until it was 0 dBm. We decided to choose such a large amount due to the fact that the proposed work detects anomalies based on signal strength. By employing a high transmitted power, a foe attempts to attract the nodes in the sensor field. Therefore, the adversary-node is required to configure the transmitted power to be higher than the agreed-upon transmitted power P_t . The adversary-node will quickly lose its power as a result of this strategy. The figure in 3 depicts the typical number of nodes that are a given node's neighbors for a variety of sensor field sizes and densities of nodes. Fig. 3 is going to employ in order to determine the best possible value for the suspicious threshold.

Table 1 Parameters used in simulation

Transmitter Power – P_t	0 dBm
Antenna Gain – G_t, G_r	1
Antenna height – h_t, h_r	8.2 cm
System Loss – L	1
Receiver threshold – P_{Th}	– 98 dBm
Center frequency	868 MHz
Minimum time – t_m	10 Sec [15]
Acceptable power ratio	2%
Data sending Rate / Node	1 packet / 30 sec.
Cluster Time	1 hour
Malicious CH Power	1, 2, 3, 4, 5 dBm

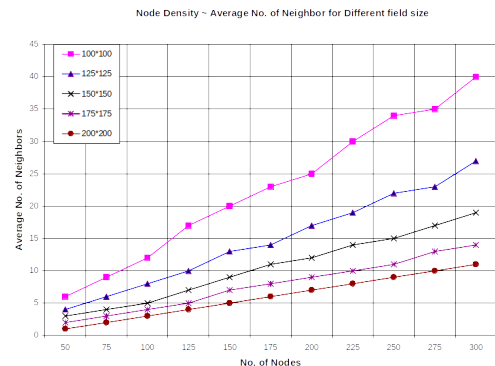


Fig. 3 Average no. of neighbors of a node for different area

At start, every node will build its own neighbor database immediately following deployment, well under the time limit t_m . After this, some nodes are chosen among the nodes that have been deployed in the sensor field to act as CHs, as shown in [23].

A CH will be selected at random to act as the malicious node. It has been decided to boost the transmission power of the harmful CH from 0 to 5 dBm. If a node determines that a CH is transmitting with a power ratio that is unacceptable, then it will open a counter to receive supportive messages from its neighbors. This CH is considered to be suspicious whenever its counter value is equal to or higher than the suspicious threshold. It was a successful investigation and detection. It is an example of unsuccessful detection where a node determines that a CH has transmitted more than the permitted power ratio but that the counter value is lower than the suspicious threshold.

5.1 Dynamic Clustering

For the purpose of making decisions regarding the detection of suspicious activity, we take into consideration two distinct kinds of suspicious threshold: (i) the dynamic suspicious threshold, and (ii) the fixed suspicious threshold. The number of a node's neighbors is a factor that influences the dynamic suspicious threshold. The values of it change depending on the node you're looking at because each node has its own neighbor database. The importance of having a fixed suspicious threshold is established through the results of an empirical study of WSNs.

The values of it are determined by the size of the sensor field and the typical number of nodes that surround a node. The field area and node density that are employed to identify potentially harmful CH during dynamic clustering are detailed in Table 2. In this particular instance, the typical number of nodes that are a node's neighbors is 17. (fig. 3). The detection rate of a malicious CH is depicted in figures 4 and 5, which show the rate of detection for a dynamic suspicious threshold and a fixed suspicious threshold, respectively, for varying levels of transmitted power.

Table 2: Field area and node density for dynamic clustering

Sensor Field Area	100m x 100m
No. of Nodes	125
Average No. of Neighbor	17

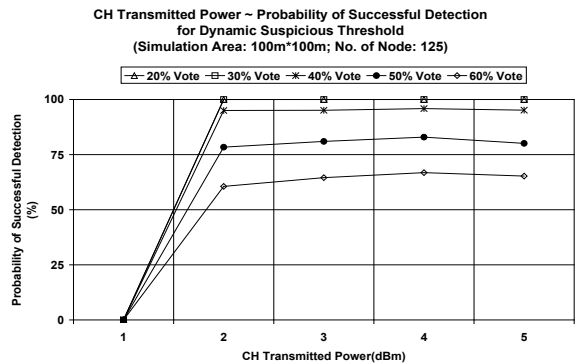


Fig. 4 Detection probability for dynamic suspicious threshold

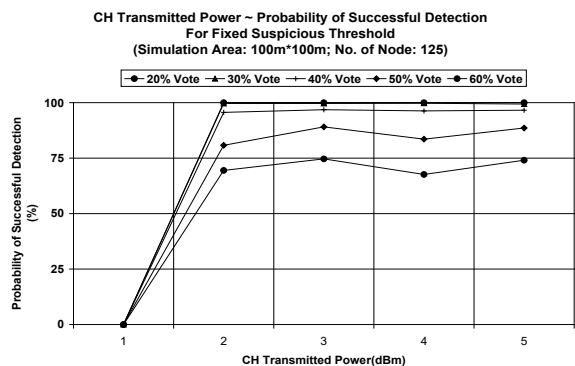


Fig. 5 Detection probability for fixed suspicious threshold

It can be observed from figures 4 and 5 that the detection probability is almost the same for both a dynamic suspicious threshold and a fixed suspicious threshold. It is quite close to one hundred percent for both the 20% and the 30% suspicious threshold. In other circumstances, the detection rate drops since nearby neighbors aren't sending any supportive messages. A node that is located a significant distance from CH may not be able to successfully identify the high transmission power of CH since the receiving power is inversely proportional to the fourth power of distances (eq.-1). Additionally, nodes are unable to detect a 2% change in the signal strength while CH is transmitting at 1 dBm.

5.2 Set a Suspicious Threshold

It has been discovered through empirical research that, as a result of the random deployment of nodes, there are occasions when 20% or 30% of a node's neighbors are almost equal to 1. Because of this, the dynamic suspicious threshold could result in erroneous detection. The value of 20% and 30% no. of average neighbors (fig. 3) of a node are around 3 and 5 respectively for the area that was employed in the simulation. A node needs two more supporting messages from its neighbors in order to pass

the 20% suspicious threshold. This value could also result in false detection if these three nodes are located within a certain distance of one another. As a result, the suspiciousness threshold for the region and nodes listed in Table 2 is set at thirty percent of neighbors who support messages. This value will serve as the basis for the fixed clustering.

5.3 Fixed Clustering

In this particular instance, the probability of detection is determined by the individuals who make up a CH. The results of an empirical investigation for the average number of member nodes associated with a CH are presented in Figure 6. In this scenario, the same region and nodes as those used in dynamic clustering are taken into consideration. The parameters that were used for fixed clustering are provided in Table 3. Every time a CH is randomly identified as being malicious, the transmitting power of that CH is increased from 0 to 5 dBm. The successful detection is seen in Figure 7 and occurs when 30% of the member nodes in a cluster identify their cluster head as being suspicious. It approaches a perfect score.

Table 3 Parameters for fixed clustering

Sensor Field Area	100m x 100m
No. of Nodes	125
Average No. of Neighbor	17
Random threshold r_{Th}	0.9
Percentage of CH	8%
Average No. Nodes/CH	10
Suspicious threshold	30% of Nodes per CH
Malicious CH Power	1, 2, 3, 4, 5 dBm
Simulation Time	1 hour
Checking time interval	5 minutes

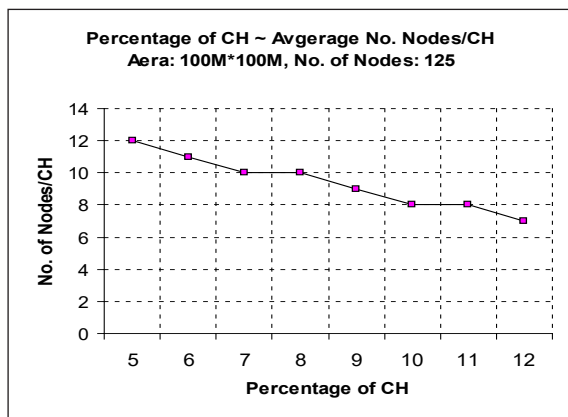


Fig. 6 Average member nodes per CH for 100m*100m

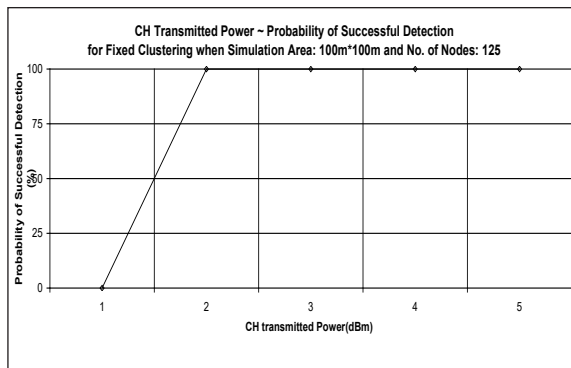


Fig. 7 Detection probability of malicious CH for fixed clustering

5.4 Packet Transmission Overhead

Instead of measuring the amount of energy consumed, we look at how many extra packets a node needs to send out in order to identify a potentially malicious CH at the 30% threshold. Figure 8 depicts the packet overhead for dynamic clustering on a per-node basis, taking into account the area and nodes listed in Table 2. When a new cluster is formed with a malicious CH, the overhead is measured per node to determine the total amount. When a node joins a cluster using dynamic clustering, it will only transmit one packet to the cluster head. A node will send 120 data packets to its CH in the course of one hour of cluster time. Therefore, a node will transmit 121 packets in the absence of any form of intrusion detection technique. According to figure 8, it has been discovered that a node will send a maximum of five additional packets if it finds any suspicious CH while the cluster is being set up. An hour has a maximum overhead of around 4% every packet, regardless of which node it comes from.

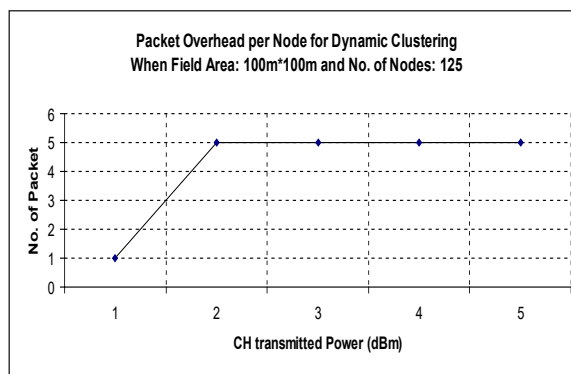


Fig. 8 Packet overhead when new cluster start at Dynamic Clustering

Figure 9 illustrates the packet overhead that is incurred by each node during an hour of fixed clustering while a member node observes the activity of its cluster head. In order to calculate the overhead of the packets, we take into

account the characteristics provided in Table 3. During the regular course of one hour's worth of simulation time, send 120 packets to its CH. If a node's CH is questionable, it will send an average of 9 extra packets than usual. The maximum amount of overhead that can be incurred by packets for each node is around 7.5%.

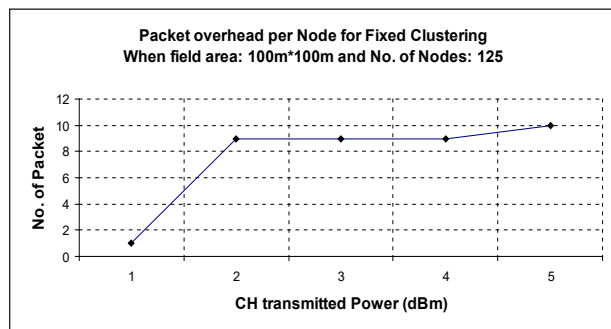


Fig. 9 Packet overhead of fixed clustering for an hour

6. DISCUSSION

The signal intensity that a node got from a CH is the most important criterion that needs to be considered in the suggested method for detecting suspicious CHs. As part of this research, sensor nodes collaborate with their surrounding nodes to identify a malevolent CH. This is the first piece of research that utilizes receiving signal power in order to identify a malicious CH in a hierarchical sensor network. The nodes monitor the amount of power that is being transmitted by their cluster leader. In other words, a node will identify a potentially malicious CH based on the strength of the received signal. According to the results of our simulation, the probability of the suggested plan being successful is heavily dependent on the encouraging messages received from its surrounding areas (fig. 4 and fig. 5). The rate of success decreases as the suspiciousness threshold increases. Therefore, the location of the nodes is of paramount importance.

The proposed method has a comparatively little impact on the communication overhead. For dynamic clustering, the fee is 4%, whereas the fee for fixed clustering is 7.5% (sec-5.4). If a node detects any anomaly in the signal it is receiving, then it is necessary for it to communicate with other nodes. The neighbor database is stored on each node in this work. This database is an integral component of the routing method. As a result, the suggested work will not result in any additional storage overhead.

The security risks posed by sensor networks are substantially influenced by the routing method that they

use [5]. However, because there are many distinct classes of routing techniques, an intrusion detection technique that was created for one category of routing is ineffective in other categories of routing. In addition, the dangers posed by wireless sensor networks to information security take many different forms. Therefore, a singular solution is not feasible. The receive signal power and the routing mechanism of hierarchical sensor networks are both utilized in the proposed detection technique. Comparing our work to other intrusion detection strategies that employ receive signal power and detect intruders for hierarchical routing techniques is one of the things that we do in this study.

Junior et al. [11] technique introduced for the first time to detect malicious nodes, which is based on the signal intensity of transmitted messages. He gave some thought to the geographical routing strategy, in which each node is aware of its position thanks to the use of GPS or another positioning technology. This experiment demonstrates a high degree of success in identifying malicious nodes. It is close to one hundred percent for high node density. The disadvantage of this approach is that each node needs to determine its position based on the positions of the other nodes.

A method to detect a Sybil attack synthetically was proposed by J. Wang et al. [28], and it is based on RSSI, combined with parameters such as the nodes' ID number, position information, and nodes' power value, etc. The methodology of the routing is hierarchical. An about 90% success rate can be expected when trying to identify a Sybil node. If the distance between nodes is more than a certain threshold, the success rate will be drastically lowered. Because of this approach, a Sybil node—a node that uses numerous identities—can be avoided. However, it is unable to defend hierarchical sensor networks from other types of routing attacks.

M. A. Hamid presented a defense against the hello flood attack [29]. In this work, a defense against a HELLO flood attack is developed by introducing bidirectional verification and multi way routing between sensor nodes while making use of a shared secret. In this case, every node is capable of computing a pairwise key using shared secrets. The concept of key distribution and key generation is essential to this body of work. The work that we have proposed is contrasted with many other intrusion detection techniques in Table 4.

Table 4: Comparison of the proposed work

Technique	Routing technique	Key Parameters	Defend Attacks	Success rate	Remarks
Junior's Scheme	Geographic	Received Signal Power	Hello Flood Attack	A l m o s t 100%	<ul style="list-style-type: none"> • Depend on knowing node position • Success rate depend on node density. • Can prevent Hello Flood Attack but not Sybil, bogus routing information • Low communication overhead.
J. Wang's Scheme	Hierarchical	Received Signal Power	Sybil Attack	A v e r a g e 90%	<ul style="list-style-type: none"> • Success rate depends on proximity between nodes. • Can prevent Sybil attack but not Hello Flood, Sink Hole etc. • Low power consumption
H a m i d ' s Scheme	Hierarchical	Key Distribution	Hello Flood Attack	Not defined	<ul style="list-style-type: none"> • Need shared secret keys • Authentication technique identified intruder • Need multipath routing so high communication overhead • Success depend on no. of keys maintained by a node • High memory overhead due to store shared keys • Can prevent Hello Flood, Sink Hole etc but not Sybil attack.
P r o p o s e d Scheme	Hierarchical	Received Signal Power	Hello Flood Attack, Sinkhole Attack	A l m o s t 100%	<ul style="list-style-type: none"> • Do not need information about node position. • Success rate depend on no. of neighbor nodes. • Low communication overhead. • No memory overhead • Can prevent Hello Flood Attack, Sinkhole Attack but not Sybil attack.

7. CONCLUSION

A method for the detection of malicious CH in hierarchical wireless sensor networks is presented in this body of work. Using this strategy, normally functioning nodes in the nearby area are able to identify potentially malicious CH activity. Because of radio irregularities and hardware, our method has the drawback of a node's potential to receive an excessive amount of power from another node. The voting method lessens the likelihood of false detection but cannot eradicate it entirely. The mechanism for detecting suspicious cluster heads protects against a wide variety of routing attacks, including the Hello Flood attack and selective forwarding. The detection method is able to determine whether or not an adversary has attempted to lure nodes to their network through wormholes, sinkholes, or other similar mechanisms by employing a powerful transmitter. In a heterogeneous sensor network, the cluster heads are chosen from among some particularly resource-dense nodes. In the event that these exceptional nodes initiate a Hello Flood attack, the proposed method will be able to identify it by checking the cluster head signal power at regular intervals. Any method of authentication will incur a significant amount of additional compute and

communication overhead. In order to reduce the burden of such communication, the base station will only verify the legitimacy of those nodes for which it has received a message indicating potentially malicious behavior. As part of our ongoing research, we are expanding the detection method to accommodate mobile nodes as well as other types of routing for WSN. In addition to this, we have an interest in developing a secure protocol for sensor networks and protecting the network from other types of denial of service attacks such as Sybil, Wormhole, and others.

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An Empirical Insight into Indian Service Organisations with Reference to Organisational Citizenship Behaviour of Employees towards Organisation and Individuals

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Abstract— *Organisational Citizenship Behavior (OCB) is now emerging as an important aspect of human behavior at work, which has a significant impact on team work and success of an organisation, which is so essential in the present-day dynamic business environment. The present study was a modest attempt to expand the knowledge base relating to the vital question of whether and how managers in service organisations go voluntarily beyond their prescribed official duties to assist and cooperate with their colleagues and, ultimately, contribute in achieving the organisational objectives, including the primary objective of maximizing shareholders' wealth in the long run. It was designed to investigate the 'perceptions of managers', working in Indian Service Organisations, regarding different dimensions of Organisational Citizenship Behavior (OCB). The present study was a descriptive research; and was intended to identify and obtain credible information on the characteristics of service sector employees' perceptions. The research sample formed by 306 employees related with concerned Indian Service Organisations, which were established in the form of public companies. The data was provided by a questionnaire which was structured according to the research questions. Various statistical techniques have been used on SPSS and MS Excel to test and analyze the hypothesized model. The findings of the present study make credible addition to the body of knowledge existing on the topic of Organisational Citizenship Behaviour and its two significant aspects viz., OCBI and OCBO. It was found that the managers of Indian service organisations have been voluntarily assuming OCBI and OCBO during 21st century; and promotion of this citizenship behaviour tendency by senior business leaders may surely promote the achievement of objectives of such organisations in the long run.*

1. INTRODUCTION

Organisational Citizenship Behavior (OCB) is behaviour that works beyond assigned official duties and contributes to the well-being of organisations. OCB is a concept that defines an individual's voluntary commitment within an organisation that is not related with his or her assigned official tasks. OCB may be linked to overall organisational efficiency, as employees' behaviours at workplace have important consequences in the organisation. Organisational Citizenship Behaviour is one of the behavioral techniques under study for improvisation in many organisations worldwide. OCB is the way in which there may be direct or indirect involvement of senior executives with the middle level managers and other employees in their organisations. OCB may lead to an open communication and a clear understanding in every employee of his/her role in the organisation.

A particular group of the companies or businesses is termed as an 'industry' whereas a very huge segment of an economy is termed as a 'sector', but both these terms are usually used interchangeably to point out the group of entities or companies which operate in similar segments of an economy, or they have similar businesses. In this paper, while analyzing primary data collected from 306 middle level managers of corporate service organisations, a distinction is made between the terms 'industry' and 'sector'. In order to put any confusion to rest at this stage itself, it is considered necessary to discuss the meaning and import of these two terms to appreciate the tone and tenor of data analysis and interpretation that follows. The term "Industry" is defined in Section 2(j) of the Industrial Disputes Act, 1947 as: "any business, trade, undertaking, manufacture, or calling of employers and includes any calling, service, employment, handicraft

or industrial occupation or avocation of workmen". An industry exists only when there is relationship between employers and employees. This definition was elaborated upon by Hon'ble Supreme Court in its landmark judgment titled Bangalore Water Supply and Sewerage Board v. R. Rajappa & Ors. [A.I.R. 1978 SC 548], whereby the term industry was given a wide scope. It was held by Hon'ble apex court that any activity would be industry if it fulfills the 'triple test' viz., (a) it is a systematic and organized activity; (b) it is carried on with the cooperation of employers and employees; and (c) it is for the production and distribution of goods or services.

2. REVIEW OF LITERATURE

Studies on OCB in India Research on Organisational Citizen Behaviour in India has been late, inadequate and influenced by the particular specialization of the researchers. Some of the available researches are briefly discussed hereunder.

Guha & Chimote (2012) attempted to identify the ways in which organisations could develop 'commitment' of the employees; and, in that endeavour, explored the relationship between organisational commitment, OCB and work-life balance. The study identified that conversion of 'job satisfaction' to OCB could be developed in phases; and came to the conclusion that OCB can be generated and practiced only when employees' perception is reciprocated by their organisations.

Sethi (2012) stated that Job Satisfaction is a pleasurable or positive emotional state of mind resulting from appraisal of one's job experiences. It may be defined as a satisfactory emotion level of an employee. The result of research indicate that job satisfaction is significantly related to organisational citizenship, and also with work-family balance.

Nair (2013) explained the relationship between the Quality of Work Life (QWL) and its effect on OCB. The purpose of the descriptive study was to identify the QWL as a predictor of OCB. The research, based on a survey among college teachers in and around Thrissur District of Kerala, aimed to offer insight and add to the existing body of literature relating to the effects of QWL on OCB. The findings indicate that there is a significant relationship between the QWL and OCB based on altruism and conscientiousness; and 21 that the perceived level of QWL among college teachers differ based on their gender. It has been noticed that female teachers feel a better QWL compared to their male counterparts.

Dash & Pradhan (2014) agree that OCB promotes efficient and effective functioning of organisations. The study

examined the relevance of OCB; and the determinants and consequences of OCB in Indian 'manufacturing' organisations. Conclusion provides a comprehensive conceptual model of OCB admitting that OCB has got many positive influences on the organisation like increasing job satisfaction, employee engagement, low absenteeism, increasing retention, etc.

Gondlekar (2014) investigated the relationship between personality factors, leadership and OCB, predict changes in OCB by personality and leadership; and analyzed the influence of demographic variables (organisational tenure, educational qualifications, age, designation, gender and job status) on OCB, personality, leadership and their dimensions. The sample, chosen randomly, comprised 203 employees from three units of Sesa Goa Ltd., a leading mining company in Goa (India). An incidental analysis using One Way ANOVA and t-test revealed significant influence of 'Organisational tenure' and 'educational level' on OCB. No significant difference was noticed on leadership and any of its dimensions. However, age, designation, gender and job status did not show any noteworthy influence on OCB.

Midha Mathur & Jain (2014) describe that OCB is mainly about actions in which employees transgress their prescribed role requirements; and it is a major factor which affects organisational effectiveness and employee performance. Based on a sample size of 125, the study explored the determinants of OCB for professional college teachers in Delhi-NCR and suggested a concrete system to develop continual OCB. This study analyzed whether social expectations, desire for personal growth, value system, professional attitude and teaching methodology and skills had an effect on OCBs.

Tambe & Shanker (2014) made efforts to understand the meaning, nature and scope of OCB and to review its various dimensions. This study touches upon the five dimensions of OCB given by Organ (1988); and makes a fleeting reference to other dimensions also which were discussed by various scholars from time to time, including the 'Extended Dimensions' stated by Farh, Zhong and Organ (2004).

Qureshi (2015) stated that concerns arise from the fact that discretion available to police officers leads to its abuse. He compared OCB research findings from US based studies in business organisations and also some studies from the criminal justice system, especially the police connections. This study utilized a survey of 829 police officers from two districts (Rohtak and Sonapat) conducted in 2013 in the Indian state of Haryana. The findings indicate that organisational justice, job satisfaction, task variables, and organisational commitment are strongly related to OCB.

The linkage of positive psychology with organisational behavior in police is used to drive home the point that there is much to be gained by focusing on positive workplace factors, though reducing the stressors is also important.

Bhatla (2016), basing her study on previous research literature, points out that job satisfaction and organisational commitment have positive impact OCB; and administrators' transformational style also impacts citizenship behavior of employees of an organisation.

Deepa (2016) examined the antecedents of employee retention applying Structural Equation Modeling. Health care experts are crucial in the provision of health services, especially nurses who happen to be extremely valuable to the organisations because they are the ones who deliver first-hand services to patients; and it is essential to make sure that skillful nurses are retained; and voluntary turnover among them is managed properly. 189 sets of questionnaire were randomly circulated to the health-care professionals in hospitals. The questionnaire comprised 100 items with fixed alternative construct questions. The respondents

were asked to rate the questions in five 23 point likert-scaling which permits respondents to have an understanding of the questions clearly. The research identified that 59% of employee retention was result of job involvement, OCBs, people management practices, Organisation loyalty and employee empowerment. This study presents adequate evidence from literature about the predictors of employee retention and also offers an empirical basis to ensure extended tenure in hospitals.

Prathiba & Balakrishnan (2017) stated that today's work place is dynamic and complex as we have three different generations at work simultaneously. The current workforce consists of baby-boomers (1945-1964), Gen X (1965-1980) and Gen Y born between 1980 and 1994. The Gen Y is tech-savvy and motivated; and technology is part of their everyday life. The objective of the work was at studying the factors that motivate Gen Y employees to remain committed to their organisations and thereby exhibit organisational commitment behaviour. Study concluded that employee engagement and organisational commitment of the employees have a positive impact on OCB.

Sethi (2019) focused on two dimensions of OCB viz., Altruism and Courtesy. The former implies helping others selflessly at the work-place, and Courtesy is mainly concerned with preventing interpersonal conflicts. Sethi's study is focused on studying the 'salary as a determinant factor' for altruism and Courtesy among the employees of telecom sector in India. Data provided by 650 employees

working in various telecom companies of Punjab is considered for evaluation. The study shows that salary is positively related to Altruism and Courtesy; whereas Altruism and Courtesy have significant relation with one another, as Altruism affects the level of Courtesy. The study concluded that higher the salary, higher is the OCB level among employees.

Gupta & Gupta (2019a) stated that Organisational Citizenship Behaviour has been an important construct in the areas of behavioral sciences, psychology and business management. Thus, OCB has captured a volume of attention during last few decades; and it facilitates change in the environment of a formal organisation because activities related to OCB provide a relaxed environment and ensures better cooperation of employees. It is expected that with an organisational environment of OCB, the tension among employees are reduced and, therefore, the productivity and effectiveness of an organisation are expected to increase. On the basis of detailed review of literature, the inevitable conclusion arrived at is that business organisations cannot grow unless their employees willingly engage in OCBs.

Gupta & Gupta (2019b) described that Organisational Citizenship Behaviour is behavior that works beyond assigned duties and contributes to the well-being of organisations. OCB is a concept that defines an individual's voluntary commitment within an organisation that is not related with his or her assigned job. Primary data for this descriptive study was collected from 306 middle level managers of Large Corporate Service Organisations of various industries i.e., Health/Hospital, Insurance, Banking, Financial Services, Hotel & Hospitality, Education, Telecommunication, IT & Software Development, etc. The study revealed that a fairly good extent of OCB towards Organisation (OCB-O) was shown by the employees of service organisations in the National Capital Region of Delhi, India.

Employees' perceptions regarding OCBO & OCBI across Indian industries of the Indian economy, remain unexplored. It is, therefore, necessary to bridge the current research gap.

OCB is a concept that describes an individual's voluntary commitment within an organisation that may not be related with his or her officially assigned tasks. Such behaviour at the workplace is predictor of "good citizen" and has important consequences for an

organisation, mostly positive [Bateman & Organ (1983), Organ (1990), Podsakoff & MacKenzie (1997), Walz & Niehoff (2000), etc.]. But, many researchers argue that such behaviour may sometimes be counter-productive;

and may be referred to as counter- 170 productive work behaviour (CWB). Dalal (2005) found that organisational intervention designed to facilitate OCB may not simultaneously deter CWB.

Spector, Bauer & Fox (2010) concluded their study by stating that CWB and OCB are 'likely unrelated' and 'not necessarily oppositely related' to other variables. In spite of some differing opinions and conclusions about the relationship between OCB and CWB and their likely impact on organisational performance and effectiveness, the overwhelming view in literature is that OCBs have positive impact on organisations. The present analysis exhibits concurrence with this view. The objectives of present research relate to investigation of OCBO and OCBI levels across of the Indian economy. Williams & Anderson (1991) classified and distinguished employees' behaviours directed towards individuals (OCBI) and behaviours directed towards the organisation (OCBO); and the present study has proceeded by provisionally accepting and maintaining that distinction. Keeping in view the macro-level significance of the Objective of the present study, data related thereto is being analyzed and interpreted separately in this chapter.

3. METHODOLOGY

3.1 Objectives

The present study intends, inter-alia to:

a. To investigate employees' perceptions regarding both components of OCB (OCBO & OCBI) across Indian industries. For the purposes of this objective, respondents were asked about their perceptions relating to both the aspects of Organisational Citizenship Behaviour viz., OCBO and OCBI. Comparison has been made about how employees

perceived OCB in various Indian industries. This objective is further divided into following sub-objectives:

- To analyze the perception of employees, belonging to different industries, regarding Organisational Citizenship Behaviour (Add-in Proficiency & Industries).
- To analyze the perception of employees, belonging to different industries, regarding Organisational Citizenship Behaviour (Civic Virtue & Industries).
- To analyze the perception of employees, belonging to different industries, regarding Organisational Citizenship Behaviour (Courtesy & Industries).
- To analyze the perception of employees, belonging to different industries, regarding Organisational Citizenship Behaviour (Altruism & Industries).

- To analyze the perception of employees, belonging to different industries, regarding Organisational Citizenship Behaviour (Morale Boosting & Industries).

3.2 Sample

It was proposed to collect data from employees of public and private sectors' service organisations relating to Health/Hospital, Insurance, Banking/ Financial Services, Hotel & Hospitality, Education, Telecommunication, IT & Software Development; and incidental response, if any, by employees of any other service organisation was to be considered under the category of 'Miscellaneous Industries'. For the primary data, the researcher used structured questionnaire to conduct survey of managers of public and private sector organisations relating to Healthcare / Hospital, Insurance, Banking / Financial Services, Hotel & Hospitality, Education, Telecommunication, IT & Software Development.

National Capital Region of Delhi (referred to as "Delhi NCR" or "NCR Delhi") is the population area for this study. This area includes Indian Capital and cities of neighbouring states of Haryana and U.P.

The unit of sample for this study was employees of Indian Service Organisations, which were established in the form of public companies under the provisions of the Indian Companies Act or foreign companies having a place of business in India. In consultation with experts in related field, it was decided to restrict the sample of employees to 320 persons. Convenience- cum-Purposive Sampling technique (non-probability sampling method) was adopted for selecting respondents. This method has been used in collecting primary data from respondents working in various service organisations operating in the population area.

1.2 Hypotheses

Hypotheses have been formulated for achieving the above-mentioned objectives and, in turn, to have a proper insight in employees' perceptions on various dimensions of Organizational Citizenship Behavior and their relationships with demographic variables, and also to compare and analyze the extent of OCBs among the employees of service organizations.

Total of five Null Hypotheses have been formulated for achieving the objectives of this study. Corresponding Alternative Hypotheses are also formulated. The same are mentioned below.

H01: Perception of employees regarding Add-in Proficiency does not differ significantly on the basis of industry.

HA1: Perception of employees regarding Add-in Proficiency differs significantly on the basis of industry.

H02: Perception of employees regarding Civic-Virtue does not differ significantly on the basis of industry.

HA2: Perception of employees regarding Civic-Virtue differs significantly on the basis of industry.

H03: Perception of employees regarding Courtesy does not differ significantly on the basis of industry.

HA3: Perception of employees regarding Courtesy differs significantly on the basis of industry.

H04: Perception of employees regarding Altruism does not differ significantly on the basis of Industry.

HA4: Perception of employees regarding Altruism differs significantly on the basis of industry.

H05: Perception of employees regarding Morale Boosting does not differ significantly on the basis of industry.

HA5: Perception of employees regarding Morale Boosting differs significantly on the basis of industry.

1.3 Tools for Data Collection

This study used questionnaire method for collecting primary data. Since OCB was first defined by Organ (1988), it has been measured via Behavioral Check-Lists. The nature of OCB, though understood to be ‘extra-role’ or discretionary, is invariably intertwined with officially required work-behavior. In the present study, the researcher used standard questionnaire of Fox & Spector 2009.

1.4 Tools for Analysis

The following statistical tools were applied for analysis and interpretation:

- i. Average, Standard Deviation, Mean score to analyze the data of the respondents.
- ii. T-test at 5% level of significance for testing the Mean differences and statistical significance of data.
- iii. The analysis work has been done with the help of SPSS and MS Excel application software.

4. FINDINGS

4.1 Steps of Data Analysis

1.1.1 Add-in Proficiency & Industry: It is important to analyze the composite responses of respondents for “Add-in Proficiency” with regard to different industries in which they are working. For the purpose of the study, it is also important to know whether the perception of employees working in different industries is similar about OCB. To check this, ANOVA is applied.

Exhibit 1: Add-in Proficiency and Industries

Industries	Mean	Std. Deviation
Health/Hospital	3.33	.831
Insurance, Banking & Financial Services	3.12	.940
Hotel & Hospitality	3.25	.949
Education	3.13	.765
Telecommunication, IT & Software Development	3.32	.803
Miscellaneous Industries	3.37	1.108

Exhibit 1 shows the mean values of the data provided by respondents pertaining to various industries and also corresponding standard deviations. To ascertain whether there are

statistically significant differences between these mean values, it is proposed to analyze the groups’ mean data among different industries using one-way ANOVA. For this, null hypothesis H01 is formulated and tested using ANOVA. Hypothesis HA1 is formulated as an alternative. H01: Perception of employees regarding Add-in Proficiency does not differ significantly on the basis of industry.

HA1: Perception of employees regarding Add-in Proficiency differs significantly on the basis of industry. The null hypothesis H016 checks whether the perception of the respondents towards Add-in Proficiency differs significantly or not on the basis of Industries. The result of the analysis is discussed below:

HA1: Perception of employees regarding Add-in Proficiency differs significantly on the basis of industry.

The null hypothesis H01 checks whether the perception of the respondents towards Add-in Proficiency differs significantly or not on the basis of Industries. The result of the analysis is discussed below:

Exhibit 2: ANOVA (Add-in Proficiency & Industries)

Add-in Proficiency	Sum of Squares	df	Mean Square	F	P-value
Between Groups	3.126	5	.625	.815	.540
Within Groups	230.274	300	.768		
Total	233.400	305			

Exhibit 2 shows that mean values of different industries (between and within groups) are different, as perceived by the respondents. But the difference is not significant, as P value is

‘.540’ which is not significant at 5% level of significance. So, we fail to reject H01 and cannot accept HA1, the alternative hypothesis. Therefore, it is inferred that the perceptions of employees in different industries regarding Add-in Proficiency do not differ significantly.

1.1.2 Civic-Virtue & Industry: The next variable is “Civic-Virtue” in different industries. It is important to analyze the composite responses of respondents for Civic-Virtue with regard to different industries. For the purposes of this study, it is also 175 important to know whether the perception of employees working in different industries is similar towards OCB. To check this, ANOVA is applied and data tested.

Exhibit 3: Civic-Virtue & Industries

Industries	Mean	Std. Deviation
Health/Hospital	3.22	.816
Insurance, Banking & Financial Services	3.00	.808
Hotel & Hospitality	2.94	.706
Education	2.85	.742
Telecommunication, IT & Software Development	3.00	.801
Miscellaneous Industries	3.11	.887

Exhibit 3 shows the mean values of data provided by respondents from different industries and also corresponding standard deviations. To ascertain whether there are statistically significant differences in the mean values, it is proposed to analyze the data to test for the differences in mean scores among different industries using one-way ANOVA. For this null hypothesis H02 is formulated and tested using ANOVA. HA2 is also formulated as alternative hypothesis.

H02: Perception of employees regarding Civic-Virtue does not differ significantly on the basis of industry.

HA2: Perception of employees regarding Civic-Virtue differs significantly on the basis of industry.

The null hypothesis H02 checks whether the perception of the respondents towards Civic- Virtue differs significantly or not on the basis of different industries. The results of the analysis are discussed below:

Exhibit 4 shows that the mean values of different industries (between and within groups) have different mean values as perceived by the respondents. But the difference is not significant, as P value is ‘.341’ which is not significant at 5% level of significance. So, we fail to reject H02 and cannot accept HA2, the alternative

hypothesis. Therefore, it is inferred that the perceptions of employees in different industries regarding Civic Virtue do not differ significantly.

Exhibit 4: ANOVA (Civic-Virtue & Industries)

Civic-Virtue	Sum of Squares	df	Mean Square	F	P value
Between Groups	3.547	5	.709	1.136	.341
Within Groups	187.313	300	.624		
Total	190.859	305			

1.1.3 Courtesy & Industry- The next variable is “Courtesy” in various industries. It is important to analyze the composite responses of respondents for courtesy with reference to their industries. For the purpose of the study, it is also important to know whether the perception of employees working in different industries is similar towards OCB. To check this, ANOVA is applied and data tested.

Exhibit 5: Courtesy & Industries

Industries	Mean	Std. Deviation
Health/Hospital	2.85	.703
Insurance, Banking & Financial Services	2.86	.863
Hotel & Hospitality	2.84	.835
Education	2.66	.671
Telecommunication, IT & Software Development	2.89	.765
Miscellaneous Industries	3.26	.794

Exhibit 5 shows the mean values of data provided by respondents in various industries and their corresponding standard deviations. To ascertain whether there are statistically significant differences in the mean values, it is proposed to analyze the data to test for the differences in mean scores among different industries using one-way ANOVA. For this null hypothesis H03 is formulated and tested using ANOVA. Hypothesis HA18 is also formulated as an alternative. H03: Perception of employees regarding Courtesy does not differ significantly on the basis of industry.

HA3: Perception of employees regarding Courtesy differs significantly on the basis of industry. The null hypothesis H03 checks whether the perception of the respondents towards courtesy differs significantly or not on the basis of different industries. The results of the analysis are discussed below:

Exhibit 6: ANOVA (Courtesy & Industries)

Courtesy	Sum of Squares	df	Mean Square	F	P-value
Between Groups	6.665	5	1.333	2.224	.052
Within Groups	179.835	300	.599		
Total	186.499	305			

Exhibit 6 shows that the mean values of various industries (between and within Groups) are different as perceived by the respondents. But the difference is not significant, as P value is ‘.052’ which is not significant at 5% level of significance. So, we fail to reject H03 and cannot accept HA3, the alternative hypothesis. Therefore, it is inferred that the perceptions of employees in different industries regarding courtesy do not differ significantly.

1.1.4 Altruism & Industry- The next variable is “Altruism” in different industries or large corporate service organisations. It is important to analyze the composite responses of respondents for Altruism with regard to different industries. For the purpose of the study, it is also important to know whether the perception of employees working in different industries is similar towards OCB. To check this, ANOVA is applied and data tested.

Exhibit 7: Altruism & Industries

Industries	Mean	Std. Deviation
Health/Hospital	3.53	.708
Insurance, Banking & Financial Services	3.33	.857
Hotel & Hospitality	3.34	.943
Education	3.21	.742
Telecommunication, IT & Software Development	3.35	.728
Miscellaneous Industries	3.65	.887

Exhibit 7 shows the mean values of data provided by respondents in different industries and their corresponding standard deviations. To ascertain whether there are statistically significant differences in the mean values, it is proposed to analyze the data to test for the differences in mean scores among different industries using one-way ANOVA. For this null hypothesis H04 is formulated and tested using ANOVA. Hypothesis HA4 is also formulated as an alternative. H04: Perception of employees regarding Altruism does not differ significantly on the basis of Industry.

HA4: Perception of employees regarding Altruism differs significantly on the basis of industry. The null hypothesis

H04 checks whether the perception of the respondents towards altruism differs significantly or not on the basis of industries. The results of the analysis are discussed below:

Exhibit 8: ANOVA (Altruism & Industries)

Altruism	Sum of Squares	df	Mean Square	F	P Value
Between Groups	4.575	5	.915	1.435	.211
Within Groups	191.279	300	.638		
Total	195.854	305			

Exhibit 8 shows that mean values of various industries (between and within groups) are different as perceived by the respondents. But the difference is not significant, as P value is ‘.211’ which is not significant at 5% level of significance. So, we fail to reject H04 and cannot accept HA4, the alternative hypothesis. Therefore, it is inferred that the perceptions of employees working in various industries regarding altruism do not differ significantly.

1.1.5 Morale Boosting & Industry- The next variable is “Morale Boosting” in various industries or large corporate service organisations. It is important to analyze the composite responses of respondents for morale boosting with regard to different industries. For the purpose of the study, it is also important to know whether the perception of employees working in various industries is similar towards OCB. To check this, ANOVA is applied and data tested.

Exhibit 9: Industry-wise Morale Boosting

Industries	Mean	Std. Deviation
Health/Hospital	3.48	.859
Insurance, Banking & Financial Services	3.24	.931
Hotel & Hospitality	3.17	.850
Education	2.98	.854
Telecommunication, IT & Software Development	3.07	.905
Miscellaneous Industries	3.27	1.028

Exhibit 9 shows the mean values of data provided by respondents working in various industries along with their corresponding standard deviations. To ascertain whether there are statistically significant differences in the mean values, it is proposed to analyze the data to test for the differences in mean scores among different industries using one-way ANOVA. For this null hypothesis H05 is formulated and tested using ANOVA. Hypothesis HA5 is also formulated as an alternative.

H05: Perception of employees regarding Morale Boosting does not differ significantly on the basis of industry.

HA5: Perception of employees regarding Morale Boosting differs significantly on the basis of industry.

The null hypothesis H05 checks whether the perception of the respondents towards morale boosting differs significantly or not on the basis of industries. The results of the analysis are discussed below:

Exhibit 10: ANOVA (Morale Boosting & Industries)

Morale Boosting	Sum of Squares	df	Mean Square	F	P-value
Between Groups	6.914	5	1.383	1.703	.134
Within Groups	243.585	300	.812		
Total	250.499	305			

Exhibit 10 shows that mean values of various industries (between and within groups) are different as perceived by the respondents. But the difference is not significant, as P value is '.134' which is not significant at 5% level of significance. So, we fail to reject H05 and cannot accept HA5, the alternative hypothesis. Therefore, it is inferred that the perceptions of employees in different industries regarding morale boosting do not differ significantly. The analysis highlights that in the corporate service organisations, the availability of OCB is at moderate to higher level. Present study partially supports the studies of Basirudin et.al. (2016), Ngugi (2017) and Ali & Ullah (2018).

The analysis reveals that the perceptions of employees, in null hypotheses H01 to H05 formulated to investigate various dimensions of OCB across industries, do not differ significantly. Data related to dimensions like Add-in Proficiency, Civic-Virtue, Courtesy, Altruism and Morale Boosting has been examined; and it is inferred with a reasonable degree of certainty that OCBs of middle level managers across various industries do not differ significantly. It implies that employees in large corporate service organisations voluntarily contribute to the said dimensions of OCB; and their citizenship behaviour is beneficial for individuals and their organisations.

5. CONCLUSIONS

5.1 Conclusion

Using the primary data collected from 306 middle level managers of corporate service organisations established or operating from the National Capital Region of Delhi, analysis of employees' perceptions regarding OCB towards Organisation (OCBO) is bifurcated into two sub-factors viz., Add-in Proficiency and Civic-Virtue. Add-in

Proficiency is related with employees' efforts which are expected to 'directly' improve the work performance of organisations. Civic-Virtue is related with employees' efforts which contribute 'indirectly' to the effectiveness of organisations. It has been found that employees of these organisations perform many OCBO activities very frequently for development and effective performance of their 194 organisations. Employees also make efforts to increase their efficiency for smooth functioning of their organisations; and their actions ultimately add to the goodwill and profitability of such organisations. Such actions credibly contribute to the achievement of organisational objectives in the long run. For analyzing OCB towards Individuals (OCBI), further three sub-factors are created viz., Courtesy, Altruism and Morale Boosting. Courtesy is related to personal well-being of co-workers. Analysis reveals that employees volunteer themselves to cooperate with their co-workers in their personal issues also. Altruism relates with co-workers for improving work performance. The indications are that middle level managers normally give suggestions, offer advice to improve the work and even give their time for orientation of new employees. Morale Boosting relates with boosting the morale of co-workers; and often employees voluntarily inform their managers for a co-worker's excellent performance. Such actions help in creating congenial work environment in an organisation. In this study, the analysis focused on the perceptions of middle-level managers regarding Organisational Citizenship Behaviour and its two components viz., OCBO and OCBI in organisations rendering various services to the society. Analysis of Organisational Citizenship Behaviour towards Organisation (OCBO) shows average improvement in the work environment in organisations. On the other hand, analysis of OCBI shows that activities are performed by employees quite frequently as per their perceptions. Following broad conclusions are drawn from the present analysis:

- Organisational Citizenship Behaviours have positive impact on both - organisations and individuals working therein. OCB provides various dimensions that help organisations for better performance and effectiveness. Present study partially supports the studies of Organ (1988), Podsakoff et.al. (1990), Dyne, Graham & Dienesch (1994), Podsakoff & MacKenzie (1997), Khan et.al. (2017), Sethi (2018), but supports the studies of Yao & Mingchuan (2010), Dash & Pradhan (2014). However, the present study does not support the research results of Phetphongphan & Ussahawanitchakit (2015).
- Civic-Virtue is exhibited by the respondents quite frequently. The employees of organisations

belonging to various industries, whether in public sector or private sector, predict these behaviours repeatedly in their working life. The analysis of the present study confirms the study of MacKenzie, Podsakoff & Fetter (1991), James, Velayudhan & Gayatri Devi (2010). This study does not support the study of Podsakoff, Ahearne & MacKenzie (1997). Present study partially supports the study of Farah, Zhong & Organ (2004) and Lo & Ramayah (2009); and strongly supports the study of Silva & Ranasinghe (2017).

- OCB also helps individuals in increasing their personal well-being, improving work performance and boosting their morale. It may be inferred that OCB towards Individuals (OCBI) is depicted by the respondents quite frequently. Present study partially supports the study of Podsakoff et.al. (2009).
- Employees are always ‘there to hear’ when their co-workers have any personal problem. The present study confirmed the results of James, Velayudhan & Gayatri Devi (2010) and Silva & Ranasinghe (2017); and partially supports the study of Farah, Zhong & Organ (2004) and Lo & Ramayah (2009).
- Employees are always ‘there to share’ their experiences and help co-workers to learn new skills. The present study supports the study of MacKenzie, Podsakoff & Fetter (1991) but partially supports the study of Walz & Niehoff (2000), Lo & Ramayah (2009) and Dinka (2018). Analysis of current study does not confirm the findings of Silva & Ranasinghe (2017).
- The overall analysis regarding Organisational Citizenship Behaviour across various Indian industries highlight that the availability of OCB is at moderate to higher level. Present study partially support the study of Basirudin et.al. (2016), Ngugi (2017) and Ali & Ullah (2018).

5.2 Limitations of the Study

The current study has certain limitations. All variables were assumed with self-report measures at one time point. But, precautions have been taken by the researcher to develop a systematic study to reduce the bias component to its lowest level. Still, there remain some errors or shortcomings, which may include the following:

1. The sample of the study was limited to managers of Indian Service Organisations established or operating in the National Capital Region of Delhi (Delhi NCR) only. The results may somewhat vary if similar studies are conducted in other cities or regions of India.

2. The study has been confined to only ‘service sector’ organisations; and, therefore, the perceptions of employees of manufacturing/ industrial sectors have not been taken into account. A similar study on citizenship behaviours of employees of manufacturing organisations may lead to somewhat different results.
3. Convenience-cum-Purposive sampling, used for this study, has its own weaknesses.
4. Non-availability of previous studies on OCB of employees in Indian service organisations is felt as a constraint, as no comparison could be made with other similar studies.

It is admitted that no research study may be completely flawless and/or inclusive of all possible aspects; and the interesting topic of the present study needs discussion and further research covering more number of industries and a wider geographical area and, perhaps, using different sampling methods.

5.3 Suggestions for Future Research

In the present day dynamic and competitive business environment, the concept of OCB assumes considerable significance, as employees have to be kept motivated to perform team work and positively help their organisations to achieve the predefined objectives ensuring their sustained growth. Employees’ job satisfaction combined with transformational leadership may pave the way to sustain large businesses, and thereby enhance wealth of the shareholders in the long run. In view of this, more elaborate studies may be conducted in future including therein certain prominent predictors, antecedents and dimensions of OCB, especially job satisfaction, organisational loyalty and commitment, organisational and procedural justice and transformational leadership.

A larger sample size of the future studies may, perhaps, provide more accurate results. More studies may be concentrated on employees and professionals working in manufacturing and other industrial sectors. Future studies may also include respondents from other Indian States; and then Inter- State comparisons may also be attempted.

Before winding up, it may be reiterated and reaffirmed that the present study and the suggested future research may be credible value addition to the existing body of knowledge on the interesting topic of Organisational Citizenship Behaviour (OCB); and the same may also strengthen the traditional argument in favour of promoting and nurturing ‘informal organisations’ for sustained growth of the formal business organisations.

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Stress Management

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Abstract— *The multinational culture, seamless borders, increasing exposure, and expectations have resulted in a competitive market arena. This demands better performance, higher scores, and improved achievements. Everyone is struggling to excel. All this has resulted in an environment of anxiety, uncertainty, pressure, and tension. This mental state of tension is more specifically known as 'Stress'. Stress is, in fact, our body's automatic reaction to some opportunity, challenge, difficulty, ambiguity, or trauma in life. This has become so prevalent and unavoidable these days that it is often considered normal. Everyone has to deal with it, but different people have different ways to deal with and manage it. Some may perform better in a stressful situation whereas some may collapse. Generally, it is considered a negative emotion and adversely affects the physical, psychological, and professional well-being of people. Along with the well-being of people, it also affects their behaviour and performance at work. So, it is a matter of concern not only for the general people or the employees but also the employers and the organizations. Given the prevalence of stress and its impact on our day-to-day lives, it is important to understand various aspects of stress so that people can benefit from learning about their condition. By understanding the status, they can initiate take action to control or manage it.*

Key Words: Anxiety, Anger, Distress, Eustress, Mental and Emotional Wellbeing, Positive Experience Index (PEI), Swamped Stress, Worry.

INTRODUCTION

Stress is notably a universal phenomenon and has become an inevitable part of everyone's life nowadays. All human beings, irrespective of the differences among them, experience it sometimes during their lives. The level of uncertainty in each field, peer pressure, competition, shortage of resources, and various professional and personal factors are among the major stressor of the current times. The increasing population and availability of qualified professionals offering their services in the job market have increased the pressure on scarce resources and limited employment opportunities. So, there is a

mad rush to prove themselves among the millennials. This has resulted in tough competition, a sense of rivalry among them, and increasing frustration, anger, and anxiety. Almost everyone, be it the students, the working population, the job aspirants, the managers, the officials, or the businessmen is facing the stress of one kind or the other.

Stress, in a literal sense, is a force exerted on any object that tends to change the originality of that object. In terms of organizational culture, stress can be defined as a state of being, in which the efficiency, productivity, behaviour, and conduct of a person change because he is exposed to various challenges and works under a lot of pressure. All this changes the way, he feels, behaves, acts, or performs. It can be understood as a sense of mental and physical unease or turbulence. It may result from unpleasant thoughts, an uncontrollable happening, or a situation that makes him feel restless, irritated, angry, sad, nervous, or burnt out. Thus 'Stress can be defined as the body's reaction to an event, thought, feeling, situation, pressure or challenge'. Everyone experiences stress, and to a great extent, it has become a normal and unavoidable part of human life. It can be positive (known as eustress) which helps to excel and achieve better. It may be due to an upcoming event, performance, wedding, or the holidays about which people get excited, and motivated but stressed as well. On the other hand, negative stress (known as distress) causes anxiety, unease, concern, and continuous pressure leading to various physical, mental, behavioural, and professional challenges. Though stress, generally, is used to refer to the second one.

WORLDWIDE IMPACT OF STRESS

Stress is one of the most common negative emotions, affecting almost one out of three, irrespective of age, sex, region, religion, caste, or creed. The widespread prevalence of this state of mind forces us to consider it more seriously and take the required action to control it.

According to 'The State of Global Workplace report 2022', the Stress (or negative emotions, or low positive emotions) experienced by the world's workers was at 43%, this percentage went even higher in 2021 to 44%

of the workers experiencing stress regularly, impacting the workplace effectiveness.

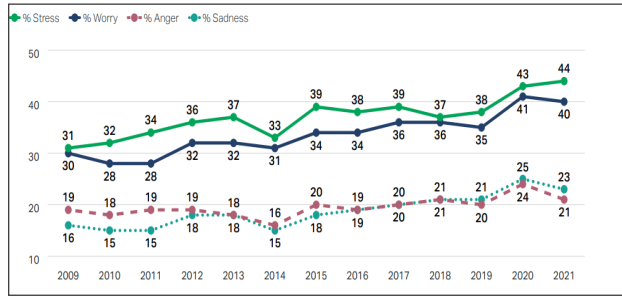


Fig 1- Daily Negative Emotions experienced by the worldwide workers

The above diagram shows that negative emotion including stress is impacting the lives of people all over the globe and is continuously on a rise. Globally, almost 35% of people in general are experiencing a lot of stress (lowest positive experience or high negative emotions) during their daily routine.

There is a decline in the average PEI all over the world, indicating an increase in low or negative emotions and feelings. Stress being an important constituent of negative emotions is also on a rise. The Trend Line shown below depicts the year-wise PEI status of the Lowest Positive Index worldwide.

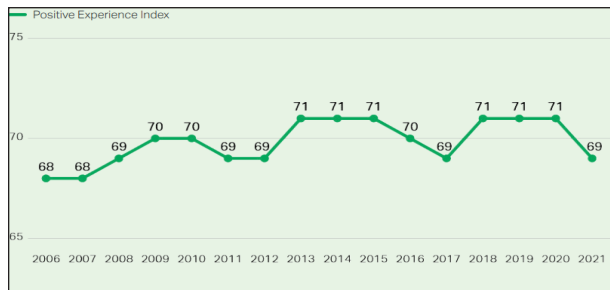


Fig 2- Average Positive experience index worldwide (PEI)

Moreover, the impact of COVID-19 on the lives of people has further worsened the situation over the past years. Following are the countries with the lowest positive experience index according to Gallup 2022 survey.

Lowest Positive Experiences (high on Stress, Sadness, Anger or Pain) country wise

Country	Positive Experience Index (PEI)
1. Georgia	60
2. India	60
3. Morocco	60
4. Sierra Leone	60
5. Ukraine	60
6. Algeria	58
7. Bangladesh	58
8. Jordan	58
9. Tunisia	57
10. Nepal	53
11. Egypt	52
12. Turkey	42
13. Lebanon	37
14. Afghanistan	32

7. Bangladesh	58
8. Jordan	58
9. Tunisia	57
10. Nepal	53
11. Egypt	52
12. Turkey	42
13. Lebanon	37
14. Afghanistan	32

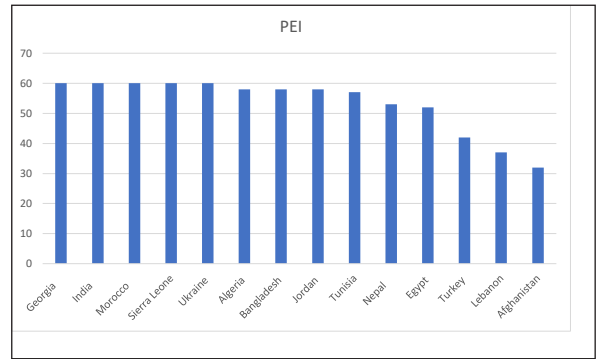


Fig 3- Lowest PEI Countries Worldwide

The Positive Experience Index scores (higher the better) globally ranged from the highest 85 in Panama to the lowest 32 in Afghanistan, the lowest score that Gallup has measured for any country till now. Where the higher scores positive score points to the fact that positive emotions are more common in a particular country than negative emotions. These scores are based on the people’s perceptions of different countries about their emotions, freedom, and their living standards. This leads to increase the concern to understand the most common stressors and develop suitable stress management techniques to live stress free and happy life.

CAUSES OF STRESS

Although many people experience stress in their day-to-day routine, the cause of the stress may vary from person to person.

Whatever causes your stress, might likely be something very familiar to you or completely unknown to you. Moreover, sometimes what causes your stress, may not be a stressor for someone else because of the differences in the perceptions of the two! For instance, one person may get upset when he got stuck in a traffic jam, whereas another might just switch on his favourite music and start relaxing in the middle of the jam by counting it as a mild disruption. But on a serious note, it causes more harm than one may think. According to the Gallup report 2022, stress levels have culminated as reported by the respondents (44% of people reported their stress at a workplace for most of the time during the day).

So given the damages, it may cause to your professional or personal life; it is very important to understand the causes of stress and chalk out a road map to manage and control it to the extent possible.

The most common causes of stress are:

1. Relationship Stress

We all are social beings. We need relations at every stage of our lives. Our parents, siblings, life partners, kids, friends, co-workers, social networking friends, etc. all are an important part of our lives. We want to have healthy and cordial relations with them. But the difference of opinions, communication gaps, misunderstandings, lack of time, unmet expectations, etc. create problems and cause stress. The stress caused due to these relations put us under constant psychological pressure and affects our mental, physical, and professional well-being. Moreover, this may lead to relationship failure, or adversely affect our performance at work or our appraisal or under extreme circumstances, we may lose our job.

2. Parenting Stress

This kind of stress is very common these days because almost in every household, both parents are professionally qualified and working. They often find themselves coping with their hectic schedules, managing their professional demands, household chores, and the requirements of the kids. Even though they try to maintain a work-life balance, still quite often they experience high levels of stress in bringing up their kids and justifying their job responsibilities. The prolonged results in their poor performance, frustration, arrogant behaviour, and conflict in their relations. Moreover, the kids also feel deprived of their parent's time and attention and develop various personality and behavioural disorders.

Single parenting is also an added concern for parenting stress, and it is on a rise these days.

3. Professional Stress

The professional work environment has changed drastically after the introduction of multinationals in our country. No doubt, professionals have a lot of exposure and opportunities these days but are also exposed to exorbitant professional competition and rivalry, creating a lot of stress. Moreover, after the digital revolution and the post-pandemic new normal, there are no defined working hours. Rather, the working hours have stretched into the personal time and space of the people, leaving behind very less or no time for self or family.

According to the 2022 Gallup report, based on a survey of 112,312 business units. The main causes of feeling "burned out" at work are unclear commands and lack

of necessary support from managers, unfair treatment at workplace, excessive workload, and unjustified timeline. Moreover, the survey reports that the women employees reported higher levels of stress compared to their counterparts consistently across the globe.

The person with professional stress experiences anxiety, depression, mood swings, frustration, lack of trust, and chronic fatigue leading to poor performances, low efficiency, accidents, conflicts, lack of coordination, blame game, and a lot more. This stress affects the personal well-being and the health of the person along with affecting his efficiency and productivity at work. Furthermore, the adverse impact of workplace stress impacts the employer as well because happy and satisfied workers may increase profits by up to 23% compared to those with 'stressed' employees (Gallup 2022 report) because of higher efficiency at work, lower accidents, absenteeism, and turnover.

4. Financial Stress

Money is one of the main causes of stress. Shortage of funds can be a big reason for continuous stress. People need funds for everything starting from necessities to luxuries. It is needed in all walks of life. Moreover, the requirement of finance is continuously increasing due to the increasing cost of living and to maintain a standard of living. According to the Gallup report 2022, from a global perspective, only 22% of people felt they were comfortably living on their current income.

Furthermore, it is also required to build a public image and face peer pressure. Lack of funds may create a lot of stress which may express itself through chronic headaches, upset stomach, high blood pressure, insomnia, consistent lack of well-being, and frequent arguments and conflicts with loved ones.

5. Swamped stress

This is a very recent but culminating cause of stress. Nowadays people, especially the millennials, are getting overloaded with so much to manage that they just get strangled by stress. They are busier than ever to meet the increasing demands of their profession, family, and kids and to meet financial expectations of themselves and family. In some cases, busyness is due to some urgency or important work to be done, such as the need to earn more to meet the necessities of kids and family. But some other times, it may be due to a perfectionist attitude, unnecessary competition, an inferiority complex, peer pressure, or some guilt, etc. All of this leaves little time for the self or family, which further leads to various health issues, and family or social issues, adding to the stress in their lives.

Along with the above-mentioned causes, there are some less severe but routine-type stressors causing regular inconveniences. They may include indiscipline, mismanagement of things, postponing work, forgetfulness, etc. These are quite insignificant hindrances, but their frequency may become a major cause of unease, anger, irritation, and anxiety affecting physical, mental, and professional efficiency and well-being.

CONSEQUENCES OF STRESS

Stress has a much deeper and more severe impact on the lives of people than one can think. Though it affects different people in different ways and gets reflected through their physical body ailments, mental issues, thoughts, feelings, and behaviour. The stress also deteriorates efficiency, productivity, conduct at work or home and their life as a whole.

Therefore, it is very important to understand and identify the causes as well as symptoms of stress so that timely action may be taken to manage it efficiently.

1. Physiological Out-Turn

Stress affects our bodies in more than one way. Depending upon varying personality types, people may experience frequent headaches, high blood pressure, muscle pain, and other related muscle problems. Under highly stressful situations body may collapse and one may experience as severe symptoms as a heart or brain stork taking a toll on their life.

2. Psychological Out-Turn

Stress may result in various psychological reverberations like chronic tension, mood swings, irritability, aggression, job dissatisfaction, insomnia, depression, Emotional fatigue, etc. All these may result in mental, physical, and professional collapses.

3. Behavioural Out-Turn

Negative stress, also known as distress, unfavourably affects the way people interact and behave with others. It impairs their ability to remember vital information, work-related efficiency, and take timely and effective decisions. It also leads to frequent mistakes and accidents at the workplace. Stressed-out people generally misuse authority and shirk responsibility, and their absenteeism from the office increases because the stress results in a varying degree of physical and mental sickness. The general stress reaction is either fight or flight. Absenting from work or avoiding responsibility, is a way of temporarily avoiding a stressful situation to find time to strengthen and revitalize themselves, which is considered as 'flight' mode. Whereas aggression is considered a fight reaction to stress more

often resulting in verbal conflicts or sometimes leading to workplace hostility as well.

4. Quality of Work Life

Low quality of work-life or job burnout is a recently identified special type of work-related stress. It may be defined as the quality of an employee's work-life in an organization.

To some extent, it may be affected by the core characteristics of a person such as personality traits, cultural background, family life, etc. It is a type of chronic physical or emotional fatigue resulting in reduced efficiency, poor sense of accomplishment, and a feeling of lost personal identity. Excessive work pressure, increasing work demands, lack of role clarity, communication gap, biased behaviour at work, etc. results in interpersonal and role-related stressors and hence become the major causes of job burnout.

According to Michelle Cadieux in his '29+ Latest workplace Statistics, 2022' reports cited that Employees experiencing a lot of Daily stress - 44%

The topmost reasons for workplace stress as cited by employees

- Toxic corporate cultures as a reason for quitting jobs- 62% of employees
- Close Monitoring causing stress -60% of people
- Pay package hasn't kept up with inflation- 71%
- Financial concerns -31%
- Work-life balance -29%
- Feeling stress from reasons outside work -29%

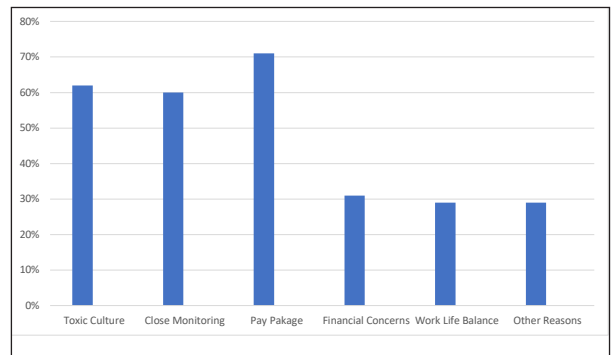


Fig 4- Topmost reasons for Workplace Stress

QWL leads to satisfied and motivated employees which results into improved productivity and other business outcomes. It also solves the problem of job burnout, employee turnover, and absenteeism. Hence, QWL benefits both the employees (their personal and professional lives) and the organizations. So, it is good

for every employer to look for the specific reasons for job burnout in their organizations and find out the ways to correct them.

Life Changes

Certain life-changing events such as physical injury or illness, death of loved ones, loss of job, divorce, etc. can trigger acute stress and adversely impacts the mental and emotional wellbeing of a person along with affecting his productivity at work.

Stress Management

After understanding how widespread and harmful stress is, it has become important to look forward to managing it in such a way that its impact can be minimized both for the employee and employer. Stress management means devising ways to deal with stress so that its unfavourable effects on the health, performance, efficiency, and conduct of the person may be irradiated or at-least minimized and he may become a healthier, happier, and more efficient person. Understanding one's stress and its causes are the first step toward its management. The process of stress management comprises a range of strategies to deal with it and minimize its impact on one's life. Following are some approaches to stress management.

Approaches of Stress Management

1) Time management

People have various responsibilities which need their time and attention. Time management helps to prioritize tasks and ensure the timely fulfilment of professional and personal commitments. Failing to do this gives a lot of stress. So, it is important to learn time management techniques to help to manage a lot of stress.

2) Problem-Solving and Decision-making skills

Problems are an inevitable part of life. No one can run away from problems, so it is important to learn problem-solving and decision-making skills. These skills give a lot of empowerments and help to prevent unnecessary stress. When you are capable to handle critical situations and take timely decisions, you become more efficient and confident. So, in that case, stress becomes easy to manage.

3) Work-life balance

Recent research indicates that having a proper work-life balance can significantly reduce stress in the workplace and your heart. Work-life balance means balancing the time between your professional requirements (work) and other personal aspects of life like spending time with your loved ones, doing things you like, attending to the household chores, etc. It is also about creating a supportive and healthy work environment so that the

employees have a balance between work and personal life resulting into better employee performance, higher productivity, and loyalty.

4) Stress management Workshops

These workshops train employees and managers about the ways to recognize and manage stress. After the workshop, the employees will be able to identify the symptoms of their stress such as increased frustration, anger, chronic headaches lack of concentration, insomnia, poor productivity, etc. once they recognize the causes, the managers can help them to relieve their workplace stress.

5) Empathetic Attitude

Developing a culture of empathy and understanding in the organization can be a good idea to reduce the level of stress. Because empathetic attitude helps a person, both the employer as well as employee, to understand the problems of others and help them solve their problems by giving a helping hand. This will lead to a supportive and collaborative workplace and help to reduce workplace stress.

6) Reassess your standards

The concept of perfection is always luring and commended. In a mad rush to be perfect in everything they do, people are unduly adding lot of stress for themselves. But it's not good to penalize yourself for the sake of perfectionism. Rather it's better to readjust your performance standards to a legitimate and rational level to control your stress levels. Furthermore, working in a stress-free environment would rather result in improving your performance.

7) Developing tolerance to ambiguity and adversity

Ambiguity, uncertainty, and adversity are a part of the personal as well as professional world. So instead of getting stressed, it is better to develop resilience skills to handle them.

8) Communication

Open and honest communication is a key to various problems both at work and in personal lives. The communication gap or misinformation may lead to a lot of confusion and conflict in personal as well as professional relations. Healthy and balanced relations are our strength and help to enhance our professional productivity along with personal well-being.

9) Mindfulness based stress reduction techniques

It is helpful for people to learn and practice mindfulness-based meditation and relaxation techniques for clarity of thought, enhanced tranquillity, a balanced mind, and stress-free life.

It is clear that, stress has crept into the daily lives of the masses and becoming a silent killer. The only way to protect the overall well-being of people is to understand the causes of stress and choose the best way to manage it so that it does not adversely hamper their efficiency & productivity at work, and it does not shatter their mental, physical, and emotional well-being.

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Serving Three Months Notice Period in the Indian IT Industry -Insights and Contradictions

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Abstract— *In this paper, we discuss the notice period trends in Indian IT industry and study its positive and negative consequences for the employer and employees. We collected details of various factors related to the three-month notice period from multiple angles. Since Indian IT organisations follow no standard notice period, it is important to understand what could be an acceptable notice period for both employees and employer. We analyse inputs received from 52 respondents and interpret them to understand the contemporary scenario in the IT industry. Finally, we suggest possible ways to come up with a standard notice period across IT industry.*

Keywords: *Resignation, Notice period, Hiring, Standardization, Global practice.*

OVERVIEW OF THE INDIAN IT INDUSTRY

Indian IT industry has been an outstanding success story, exporting software services to more than 60 countries around the globe. India is a developing economy power-driven by techno-savvy workforces developing an excellent IT industry. Indian IT sector has gone through various developmental stages. We can classify them into four different phases. Every phase has helped to take the IT industry to the next level with tremendous development and has created a mark in the global IT market. These four stages are Phase I: Before 1980, Phase II: 1980–1990, Phase III: 1990–2000 and Phase IV: Post 2000.¹

Some of the well-known and notable performers in the IT industry are HP, Tech Mahindra, IBM, Dell, DXC, Accenture, CGI India, Atos, Tata Consultancy Services, Wipro, Atos, HCL and Infosys Limited. Many of these are based in India whereas a few of them are MNCs operating from India. Therefore, in a way, we can call the latter Indian IT organisations as they follow the Indian labour and industry laws. IT industry has grown in India tremendously because of technically skilled

professionals, English speaking population, robust telecom infrastructure, lower costs of offshore outsourcing, favourable government policies and quality orientation. Indian software organisations strengthened with various value chains, providing from low-cost to comprehensive software services to meet the demands from multiple clients around the globe. A huge pool of talented technical human resources is available in India because of the well-formed professional education. Government of India has set up various educational institutions such as IITs, IIMs and NITs to meet the demands of IT and ITES support across the globe¹.

NOTICE PERIOD IN INDIA AND GLOBAL PRACTICE

Notice period is the period that an employee has to serve in the organisation from the day of tendering their resignation until they are allowed to leave the employment. In other words, notice period is the period employers require the employee to serve before their employment is considered terminated. The duration of this period varies across countries as well as across industries. However, the expected formalities from the outgoing employee is almost the same: knowledge transfer (KT) to the new employee and settlement of accounts, which includes entitlements, transfer of benefits, payment of gratuity and getting relieving documents.

Three-month notice period is unique to the Indian job market, and it is more specific to the Indian IT industry. The USA follows an ‘employment at will’ policy for jobs. In this policy, both parties, the employer and the employee, can end the employment at any time without any advance notice or giving specific reasons.

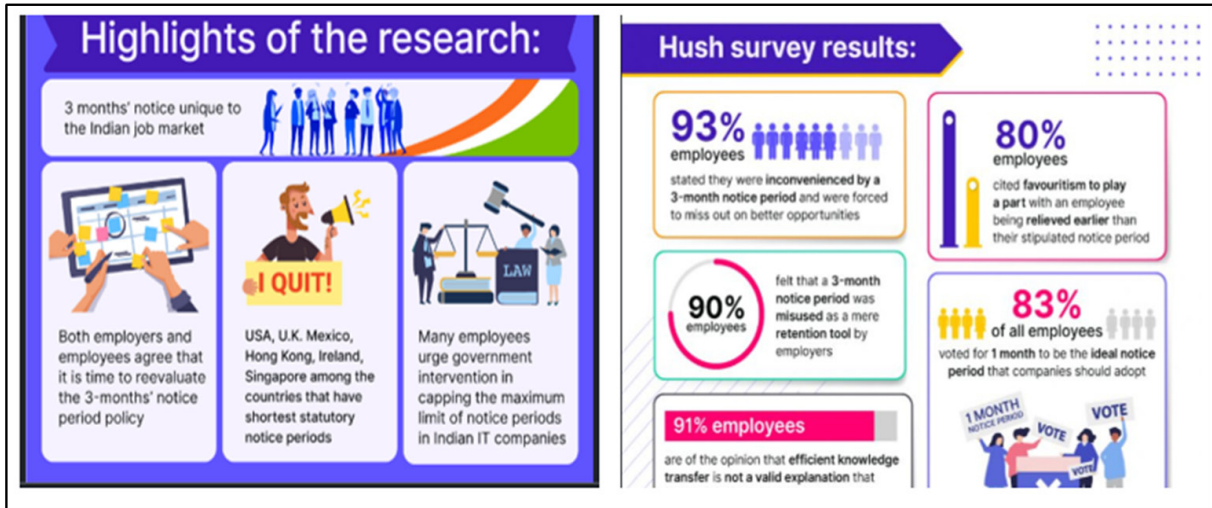


Figure 1. Various facts about the three-month notice period²

Based on mutual agreement and goodwill, they can agree for two weeks' notice. Various sources indicate that employees resigning in countries such as the USA, Mexico, Hong Kong, Ireland, Singapore, and the UK have the lowest statutory notice period, that is, one week whereas countries like Switzerland, Slovakia and the Czech Republic have two months' notice period². In most European countries, notice period increases depending on the employment duration in that particular organisation for the particular employee and it varies with certain high-ranking leadership roles³. Job changing is not very frequent in China and Japan. However, East Asian economies obligate a month's notice.

NOTICE PERIOD TREND IN INDIAN IT INDUSTRY

Tata Consultancy Services, Oracle, Accenture, Syntel, Wipro, Cognizant, Infosys, WNS, HCL ITC Infotech, Tech Mahindra, Wells Fargo, Capgemini, Mavenir systems, IBM and Genpact are some of the known companies which follow three-month notice period policy in India. The reason for three-month notice period small IT companies mention is the replacement cost and the turnaround time in filling in a new resource, including knowledge transfer, might be huge for small companies as they cannot afford benching resources⁴.

Some Indian states have exempted IT companies from adhering to the Indian labour laws and permitted them to run the business as per the nature of their business. Karnataka and Tamil Nadu have extended exemptions for IT organisations from provisions under The Industrial Employment (Standing Orders) Act 1946. This act

mandates one month's notice period for 'workmen'. A number of companies in India refuse to discuss or negotiate the notice period. In the IT sector, it is challenging to find replacements for the niche roles and related skillsets. When it comes to the IT industry in Western countries, they can manage with the short notice period, because the majority of their offshore delivery happens from India due to low cost. Many companies in India believe that a two- or three-month notice period is a useful tool to retain the employees. However, employees feel that the organisation uses it as a weapon against them. Some employers will not consider extending their offer to a candidate whose notice period is over 30 days. That is one opportunity lost for the employee. Job movement is unavoidable, and we need to understand the needs of the modern workforce. A long notice period will not be able to control the high attrition rates and/or help retaining employees. A 30-day notice period should be considered as enough irrespective of the position or seniority of the employee⁵.

INDUSTRY EXPERTS ON THREE-MONTH NOTICE PERIOD

An HR said, 'Employment in India, depending on the legal nature of the workplace, is governed by various labour laws such as the Indian Contract Act, Factories Act and Industrial Disputes Act. The most important thing to note in the notice period is that their employment contract and the terms and conditions, which employees usually sign, accept and acknowledge at the time of employee joining the organisation. The notice period as per the terms of the employment contract will apply to the employee of that particular organisation. In most of the Indian IT

organisations, 30 days is the notice period for employees on probation and 90 days for confirmed employees. The concept of the notice period is incorporated in the job offer letter to ensure business and operational continuity and to ensure a proper handover of duties between exiting and new employee. A few employers misuse the three-month notice period and unnecessarily delay relieving the resigning employee⁶.

A legal expert said, 'Notice period can be anything. However, there is no way that the company can force you to serve the full notice period. The clause in the employment agreement usually states, "ninety days' written notice or three (3) months' gross salary in lieu thereof.' Therefore, if an employee is willing to pay, the company should not raise any objections. If the company refuses to accept the resignation in person or in writing, the employee can send it to the company via email. The company should be ready to adjust the leave against the notice period if the employee has accumulated earned leaves. Employees can reach out to the high court if required as per Article 226 (which empowers High Courts to deal with any issue, to any person or authority, including the government) read in conjunction with Article 14 (which upholds the concept of equality before the law)⁷

An employment contract usually mentions some notice period or payment in lieu thereof for the termination of an employee. In the case of senior management, this is likely to be three months because the handover process may take time; in the case of other employees, this would be one month, as the impact of relieving the outgoing employee would be less. Generally, at the time of termination, the employer would check whether the compensation payable under the law is more or less than what was prescribed under the contract. If it is so, the employer will go with the lesser payment, which is a benefit for them⁸. Before 1947, industrial disputes and employee issues were handled through Trade Disputes Act, 1929. However, based on the experience of using the 1929 Act to settle industrial disputes and employee issues revealed various defects, which showed the need for a new policy. On the recommendations of the committee appointed by the Ministry of Labours, amendments were made in

the original Bill. The Industrial Disputes Act, 1947 came into force on April 1947. As an outcome of the amendment, IDA 1947 gives an option for investigation and settlement of industrial disputes. It also provided certain safeguards to the employees and the notice period issues in India can be resolved by using this Act.^{9,10,11,12}

Notice period ranges from 1 day to 4 weeks, and it is further flexible in countries such as USA, UK, Australia, Singapore, Sri Lanka, China, Europe, Canada. In contrast, in India, it is 90 days, and non-negotiable most of the times. The employee who has resigned do not want to continue for 90 days, but he or she has no choice as they may be blacklisted in the current company and also it is challenging to get the experience letter. Any complex tasks can be transitioned to another person within a month, and however regular knowledge transfer can be done from 3 days to 2 weeks usually. Three months' notice period is not justifiable one and employee may be mistreated after resignation. IT is one of the growing sectors, to ensure further growth, the notice period needs to be fixed by the Indian Ministry of Labor and Employment³.

Y. Narasimha Raja discussed various points on "What are the Major difficult phases the resigned employee will be having?". Any employee leaving the organization has multiple reasons; it could happen due to a bad boss or more cash. Most of the cases, the resigned employee misbehaves with the peers & teammates misbehave with the resigned employee. Due to various challenges, many of the employees are not willing to serve complete notice, and they wanted to be relieved by paying the money for early release. If the resigned employee does not have money to pay in the notice period, they may attempt to flee and hence employer to treat the employees properly¹³.

The international notice period policy helps to relive the resigned employee quickly and hire the replacement in a short period. Whereas in India, it leads to contradicting outcome due to 3 months' notice period. Below picture helps to understand the scenario, and it does not talk about all factors associated to three months. However, it gives various essential details to understand¹⁴.



Figure 2. Visual presentation of notice period in India and foreign nations¹⁴

“When we have got an offer letter, we need to join them in 15 days. But the notice period mentioned in the offer letter of 90 days due to that not able to join. Due to this unfair rule, we are letting the offers to go” TCS employee. “Three months’ notice period is much needed so that the KT is possible for our replacement. This seems to be an unethical practice which only curbs opportunities of an employee to shift their job,” by an employee from Infosys. “The manager allowed an employee to leave the organisation in 15 days as the employees have to go for higher studies, however, that employees were with an organisation for last three months” he adds.

Chennai-based experienced HR professional shared his thoughts which are different from the employees. “The three-month notice period can also favour the employees too. In a situation of downsizing, the employee gets economic security. However, this is an economic burden for the company,” Another experienced Bengaluru-based HR professional mentioned that working in the IT industry, the three months’ notice period and insisted as it is needed. Currently, organisations have very few buffer resources. By considering that fact, organisations need to hire the resources and ensure proper knowledge transfer. It is not that easy to get new talent within a month, and there is a colossal time to be spent on hiring and onboarding new talent, this is not something like a plug and play model.”¹⁵

Recruitment professionals across the Indian IT industry are irritated much today due to various reasons. They

are: Unanswered emails and calls by candidates, unkept promises to turn up for interviews, numerous of excuses for not joining on the agreed day, chasing multiple offers for money and position, fake resumes, getting others to attend telephonic/Skype interviews on their behalf are so common. There are genuine candidates. However, we can’t deny that we have candidates with the above qualities too. An expert started discussing the root cause of the 3-month notice period issues. Indian IT companies started adopting 2-3 months notice period, to retain people and also to refrain employees from leaving the organization. The typical justification given is that “projects are critical, finding a replacement and do the knowledge transfer takes times” are the known reasons given by the organizations. But we need to understand that there are so many large and medium-sized IT organizations in US/Canada/UK are managing well with 15-day notice period. Indian IT companies are unwilling to send their employees in less than three-month notice period. However, when they hire, they need candidates to join immediately.

When a candidate decides to change the job, usually they get the offer as a safety net. Then the 90-day notice period gives room for them to find the job with good money, better brand, position and location. When their day of availability comes lesser, then their demand will be high as an immediate joiner. Even organizations wanted to issue an offer and get them joined. Employees use this 90 days’ notice period to find a better position, instead of accepting the first offer. Finally, employees force his organization

to find out some candidates who are available to join in 15-30 days. This pattern brings multiple questions such as 1) In Indian IT industry, are we harming ourselves by adopting this unhealthy practice of 60-90-day notice period? 2) so many employers globally able to manager the notice period with two weeks. Why cannot Indian employers do so? 3) Is this something Indian IT industry need to look critically at the Talent Acquisition and Talent Management function so that the right solutions can be identified? 4) Are we not doing any research on this topic even after adopting this practice for a decade?¹⁶

In India, several banks and IT companies have notice periods of 2-3 months, says the survey of 2,800 employees. 80% of employees want the duration of the notice period reduced to a month from three months. HR expert agrees that the three-month notice period is not necessary and should be considered only for exceptional circumstances and very senior levels. According to HR head for online grocery, three month notice period is a kind of cynical approach to retain employees and bad for employee morale. Based on the anonymous response from 93% of the respondents, the three-month notice period was not convenience, and that leads to missing out on better opportunities. Founder of the talent organization mentioned that some bigger companies increased the notice period to three months to reduce attrition, which created a ripple effect, and other companies followed suit. "It can be detrimental because non-performing employees too, will benefit due to the long period"¹⁷.

The Indian IT industry is going through a significant transition in its workforce. The top IT companies, like Tata consultancy services, Infosys and HCL, have been facing high attrition rates for the past couple of years now. TCS was facing an attrition rate that has risen to 15.9% in 2016, significantly higher than the 12-13% it had been operating at two years ago. To control the attrition, TCS has extended the notice period to three months for India based employees until 2007. From 2007 till February 2016, they change the notice period to one month. Keeping a resource on the bench is an expensive proposition. So, IT companies, to reduce the costs, prefer to maintain low bench resources. When there are not enough people available, then it is not very easy to find a replacement. So, employees are now being asked to serve a 90-day notice period, explained by the chairperson of Head Hunters. However, changing the notice period from the current 30 days period might be a counter-productive move. This move may hamper the talent that comes in TCS, and it may also impact productivity. Many job seekers may not join as they see the notice period as three months, because the employers may not wait for that long when they wanted to change

the job in the future. It may impact the firm's reputation adversely. The notice period approach is something like applying a Band-Aid on a wound, whereas the medicine will solve the problem. Instead of doing this type of short-term plan, organizations must focus on investing key resources' development plan so that they can be retained as the long-term strategic plan¹³.

Over 28,000 IT employees have signed and submitted an online petition to the Labour Ministry to stop IT companies from holding the employees for the three-month non-negotiable notice period, The Economic Times reported on 2nd March 2017. "It is unrealistic for anyone to plan their future actions and resign in advance without knowing the state of the issue in next three months," the petition said. Employees at IT organizations such as Tata consultancy services, Infosys Limited, Tech Mahindra, HCL Technologies, IBM, Capgemini and Accenture have to serve three-month-long notice period after they submit their resignations. Industry experts view three-month notice period as a measure to fight attrition and employee-retention tool. Long notice period also can dissuade IT, employers, to wait for prospective employees. Additionally, the IT industry considers their employees as billable resources and hence, companies may lose revenue if a suitable replacement is not found in time. This situation forces employers to resort to various measures to retain employees¹⁸.

PROBLEM STATEMENT

There is no standard notice period in IT organisations. Some companies keep three months as the notice period, and a few require two months' notice while some organisations follow one-month notice period. Organisations following three-month notice period expect the new employee to join in one month. However, they do not relieve their outgoing employees before the notice period ends. Also, employees try to offer fake reasons and misuse the buyout option (for instance, paying back one month's salary) so that they can be relieved early. Although there are some genuine reasons to request the organisations to release the outgoing employee sooner, it often happens that the organisation does not relieve them. This situation creates uncertainty. Since employer is the decision maker, the resigning employee may not be able to predict the next action plan. Keeping a standard notice period across multiple industries may not be possible but it is important to find out an appropriate notice period, at least for the IT sector. We carried out this research to hear the diversified feedback from employees working in different positions so that we can understand their thought process and an appropriate notice period can be arrived at.

OBJECTIVES OF THE STUDY

1. To examine the current notice period practice in the Indian IT industry.
2. To examine the merits and demerits of the three-month notice period to the employer and employees.
3. To find possible solutions to identify an appropriate notice period for the Indian IT industry.

Research methodology

- ✓ **Data collection:** A Google-based questionnaire was sent to the respondents through email. The survey had three parts. The first part sought demographic details of the respondent; the second included quantitative questions with multiple answers; and the third part was qualitative, with one open-ended question.
- ✓ **Sample:** we used simple random technique for our study. We created a list of respondents that was collated from LinkedIn website and selected participants from this list.
- ✓ **Participants:** Respondents were from 11 IT organisations: Atos, Capgemini, CGI India, CTS,

Dell EMC, DXC Technology, HCL, IBM, TCS, Tech Mahindra and Wipro. We attempted to cover the respondents from different experience group (0–5 years, 5–10 years, 10–15 years, 15 years and above). We made all possible efforts to cover a range of employees such as professionals, managers, PMP, senior management and leadership professionals.

- ✓ **Approach :** We have distributed the quantitative-based questions to the respondents regarding the facts & opinions around the three-month notice period, merits and demerits to the employer and employees as well. Also, we have asked them to share their opinion about the three-month notice period, which is an open-ended question to share their voice without any restriction. Since there is no formal research in (Thesis and research article) the subject of three-month notice in Indian IT industry, we use all those inputs to discuss and arrive at a conclusion about the facts and figures around the three-month notice period issues in the Indian IT industry. We strongly believe that the outcome of this research paper should lead to other significant and useful research in the academic area in the coming days.

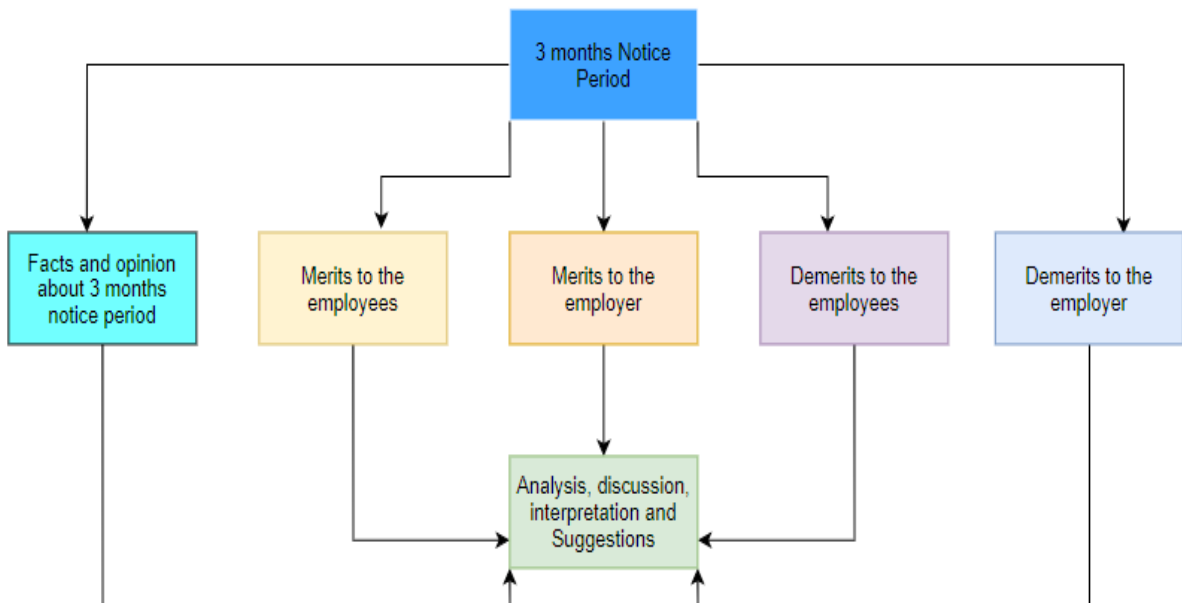


Figure 3. Theoretical approach of the article for three-month notice period.

DATA ANALYSIS

Out of the 52 respondents from the IT industry who responded to the survey, two had work experience of 0–5 years; nine respondents had work experience of 5–10 years; 19 respondents had work experience of 10–15

years; and 22 respondents had work experience of 15 years and above (Figure 4). As such, the data obtained, and the feedback received can be trusted and considered as the reflection of the contemporary status of the notice period in IT industry.

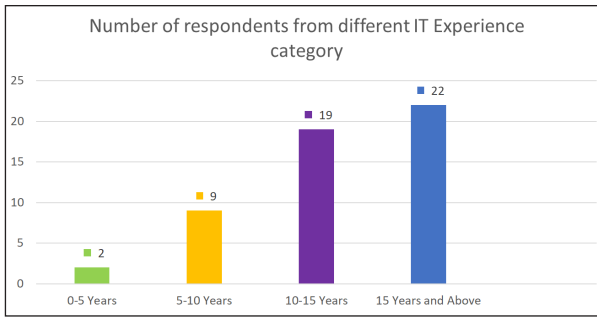


Figure 4. Experience breakup of the respondents.

To cover the opinion from a diverse range of employees, we included different employment categories. This helped to understand the perspective of the employees working at different levels. Employees, middle management and leadership people think and take decisions based on their experience and the role they play in the organisation. Out of the 52 respondents, two are from leadership category, fourteen from manager category, four from project management category, 24 from professional category and eight from senior management category. The employment categories are given below. Their distribution is presented in Figure 5.

- *Professional* (engineers, analysts, consultants, architects, tech leads, team leads)
- *Manager* (functional manager, people manager, service delivery manager, account delivery manager, operations manager)
- *Project management professional*
- *Senior management* (directors, AGMs, DGMs, tower heads, vertical leads, business leads, assistant/ associate VPs)
- *Leadership professional* (president, CEO, CFO, CIO, CTO, EVP, SVP, VP, country head, regional head, managing director, director, general manager)

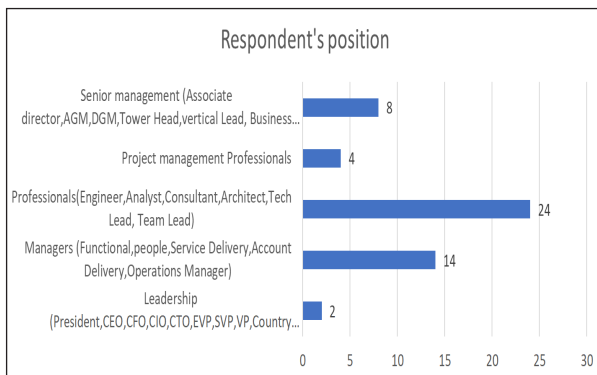


Figure 5. Respondents from different professional groups.

Majority of the organisations we received responses from the employees of are MNCs operating in India and a few are Indian organisations (Figure 6). The hybrid response pattern was necessary to have different organisations represented in the study.

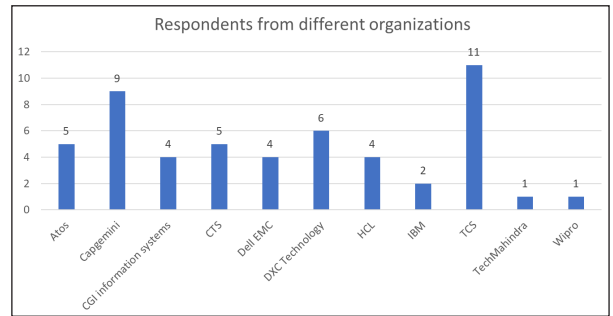


Figure 6. Respondents from different organisations.

We tried to find out the respondents' opinion about keeping three-month notice period in Indian IT organisations. Forty-three respondents (82.6%) mentioned that three-month notice period in Indian IT organisations was not fair, whereas nine respondents (17.5%) said that it was a reasonable period. The response pattern indicates that three-month notice period is not acceptable to a majority of employees (Figure 4).

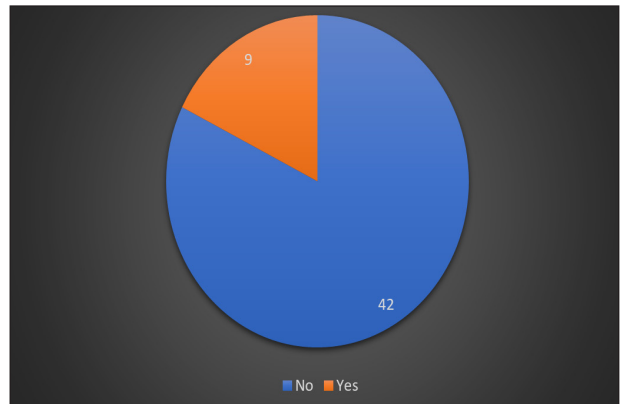


Figure 7. If the three-month notice period is fair or not.

We attempted to find out what was the percentage of IT organisations that follow a three-month notice period. Seventy-three percent respondents indicated that their organisation followed a three-month notice period; 27% respondents mentioned that the organisations they belong to does not follow three-month notice period. The response pattern indicates that most of the IT organisations operating from India follow three-month notice period. We did not want to do this analysis purposefully, as it may be considered as a breach of non-disclosure agreement. So, the statistics does not mention any specific organisation (Figure 8).

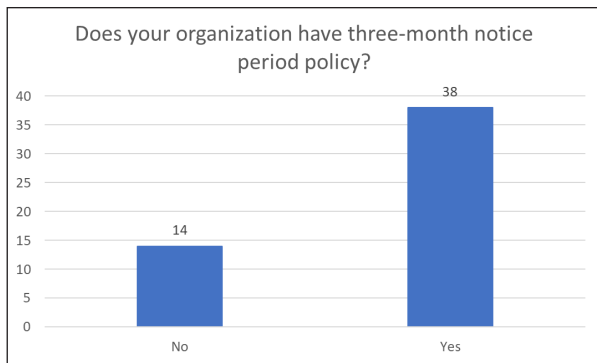


Figure 8. Present status of the notice period in different organisations.

We asked the respondents to mention the notice period they preferred. In response, 44% indicated that they preferred one month's notice period; 15% preferred 45 days; 21% said two months were fair; 11.5% respondents preferred three months; and 2% respondents preferred 15 days' notice period.

Also, there were three different opinions respondents can additionally choose from:

1. It should be mutually agreed with riders
2. As soon as employee preferred to leave
3. Depends on the job performed by the employee and the time it will take to transition the knowledge, based on which the notice period should be seven days to three months.

The responses show that 79% respondents wanted the notice period to be two months or less (Figure 9).

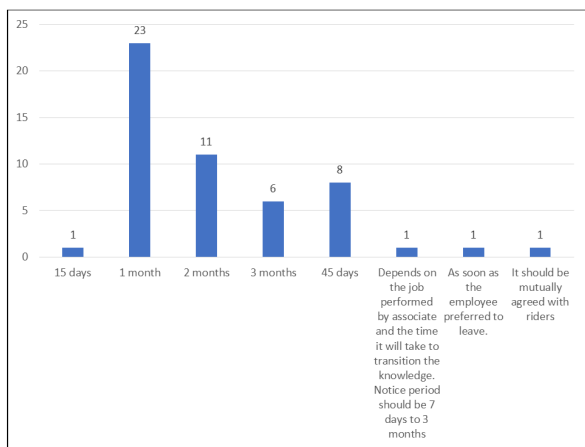


Figure 9. Preferred notice period.

We received different answers for the question 'Three-month notice period should be uniform across all IT companies so that the negative impact will be less for the outgoing and incoming employees in an organisation

(located in India, either India based or MNC). Do you agree?'

Twenty-one respondents said 'Yes'; 21 said 'No' to the question; 10 respondents were not sure (Figure 10). The number of responses for 'Yes' and 'No' is equal. This response pattern poses a question whether they think that keeping standard notice period across all IT organizations is not feasible or they prefer to have non-uniform notice period so that they can make use of it when situation demands.

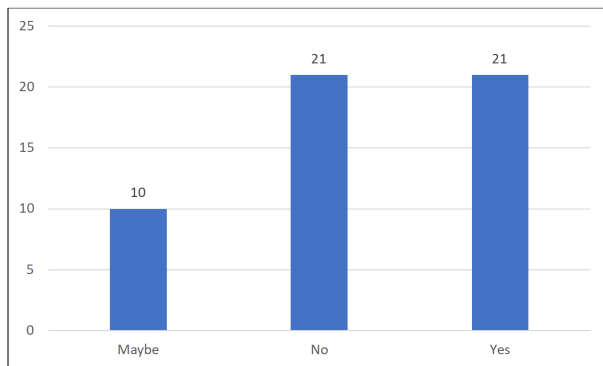


Figure 10. If three-month notice period should be there across all IT companies.

Every country follows different labour laws and it is evident, but we still attempted to find out whether the respondents wanted to keep a standard notice period across the globe. Forty-six respondents (88.5%) were positive that implementing a three-month notice period concept around the world is not feasible due to varying labour laws in different countries; three respondents (11.5%) felt that it was possible; and three respondents said that they are not sure (Figure 11). From the response pattern, it is clear that according to most of the respondents a standard notice period across the globe is not possible.

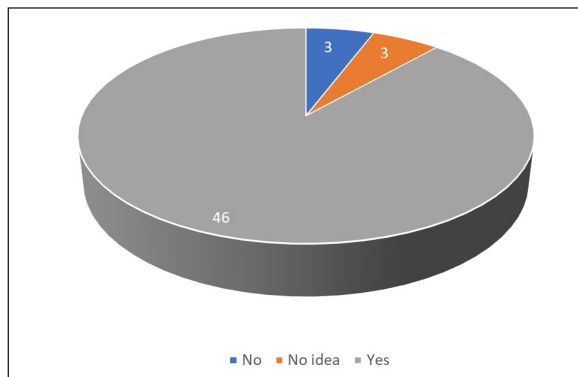


Figure 11. Whether implementing three-month notice period across the globe is possible.

For the question 'Three-month notice period policy implemented by a few of the IT organisations (located in

India) is due to various requirements – Do you agree?', 32 respondents (61.5%) responded 'Yes', 13 respondents said 'No' and 7 responded 'No idea'. The response pattern indicates that the employees felt that three-month notice period is there for some reason (Figure 12).

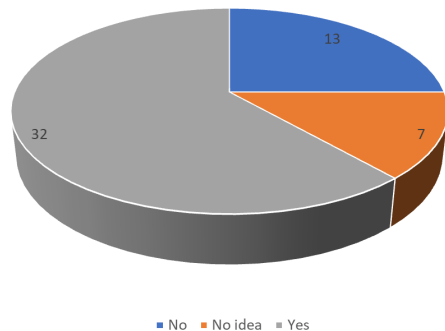


Figure 12. Are there genuine reasons to implement three-month notice period.

Five choices were given to the respondents to choose from in response to 'Please choose the benefits to the employees due to three-month notice period'. In addition, an 'others' option was also provided if the respondents wanted to say something other than the choices offered. They could also select multiple answers if applicable (Figure 10).

1. *Employees can find out better opportunities during the three-month notice period* - Thirty-one respondents selected this, which is the topmost choice. Many organisations look for candidates who can join in 1–2 months. Thus, employees can utilize this opportunity during the three-month notice period.
2. *Three-month notice period helps employees when the organisation wants to fire someone* (either they work for three months or pay the organisation amount worth their three months' salary) -Twenty-six responses were received for this, which is the second topmost choice. Downsizing and layoff are prevalent nowadays. Three-month notice period or salary for three month is the employment security for the employees.
3. *It helps the employee in case of layoff and gives the employee a certain amount of financial security* - Twenty-six responses received for this. In Western countries, there is social security but not in India. Work for three months and get paid three months' salary helps the employee to ensure his survival.
4. *It allows employees to negotiate and continue with the same employer in a different position* - Twenty-two responses received for this. Three-month

notice period helps an employee to discuss with the employer and gauge all possibilities so that the employee can grow within the same organisation. These benefits both parties.

5. *It gives sufficient time for employees to think and stay back in the same organisation* - Nineteen responses were received for this, which is the least received response among all choices. Employees can get some opportunities accidentally; however, changing job involves many risks. Three months' duration helps employees to think and correlate various factors, which may force an employee to stay back in the current organisation. Some of the respondents offered their response under the choice 'Other' as 'It never helps employees' or 'Waste of time', or 'No benefits as such' or 'Handover & transition will be smooth'.

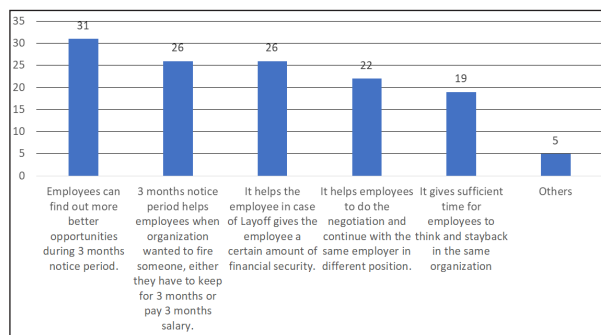


Figure 13. Benefits of three-month notice period to the employees.

Six choices were given to the respondents to choose from in response to 'Please choose the disadvantages to the employees due to the three-month notice period'. In addition, an 'others' option was also provided if the respondents wanted to say something other than the choices offered. They could also select multiple answers if applicable (Figure 14).

1. *Chances are high that employees would not get job easily outside for three-month notice* - Forty-one responses were received for this choice (which was the topmost choice). Most of the employers wanted to hire techies in a short period. If the employees say that they need to serve the notice period for three months, then the chance of their getting hired are comparatively less.
2. *Three-month notice period may lead the employees to miss out better opportunities* - Thirty-six responses were received for this choice (second topmost choice). If the position is demanding with the excellent package with short joining date, then the three-month notice period becomes a barrier for employees to pick that opportunity.

3. *During the three-month notice period is usually 'unbearable' for the employee and is often 'mistreated'* - Thirty responses were received for this choice (third topmost choice). The reaction towards the resigning employee from the peers, managers and other stakeholders may not be right. They may try to push works that are more complicated to him/her.
4. *If the employee–manager relationship is not right, it is tough for the employee to work for three months as he may get a target that may not be possible to achieve, which leads to stress-* Twenty-nine responses were received for this choice. The manager–employee relationship is critical in an organisation. It worsens when an employee resigns. The manager may try to increase the stress of the resigning employee by giving an unachievable target. If the employee opposes this approach, the relieving certificate may come with the adverse remarks
5. *Creates anxiety for the employee on notice period (90 days)* - Twenty-eight responses were received for this choice. If the approach towards a resigning employee is different from earlier, then it may create an uncomfortable situation and may lead to nervousness.
6. *If an employee fails to serve the notice period, they are often blacklisted in the existing company and are not given experience certificates* - Twenty-three responses were received for this choice (least responses). This is obvious as the organisations have a common forum where they blacklist an employee, so the resigning employee misses an opportunity.

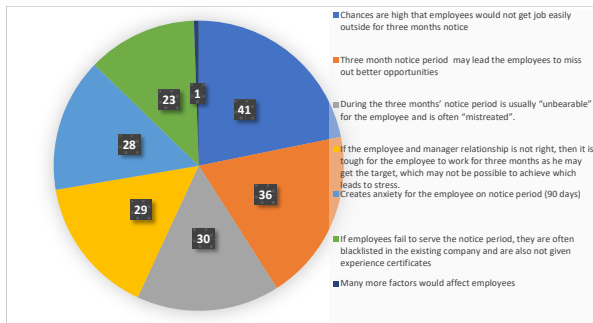


Figure 14. Disadvantages of three-month notice period to the employees.

To see if three-month notice period is beneficial to the employer, we asked the respondents, 'Please choose the benefits to the employer (organisation) due to the three-month notice period.' Seven choices were given to the respondents to choose from. They could also select multiple answers if applicable (Figure 15).

1. *Three-month notice period helps an organisation to find a suitable candidate* - We received thirty-six responses for this, which is the topmost response among all choices. Since most of the customer contracts are based on full-time employment (FTE), it helps service providers to supply necessary workforce to the customer within three months.
2. *Billing and revenue will not be affected, as an organisation would be able to fill that position in three months* - Twenty-nine responses received for this. When an organisation can fill a position in three months, it helps them to ensure continuous billing, revenue and profit margin.
3. *Employers get enough time for efficient knowledge transfer to the new joiner* - Twenty-nine responses received for this. To continue with the support to the customer as expected, it is critical to transfer the technical and process knowledge to the replacement, and the three-month tenure helps the employer to ensure a smooth transition.
4. *Three-month notice enables the organisation to get enough time to create any newer opportunities such as onsite, salary hike, better projects, work-from-home for the quitting employee. This might help retain the employee* - Twenty-six responses received for this. The three-month notice enables an employer to retain the employee through retention management by giving multiple benefits.
5. *The chances are high that employee may change the mind and stay back* - Twenty responses were received for this. Indian IT industry is going through many challenges, there are multiple consequences of changing job in the current scenario, and that may force an employee to think anytime in three-month notice period and possibly, an employee may take back the resignation.
6. *If a contract is based on full-time employment, the number of resources would not be questioned* - Fifteen responses were received for this. In fixed FTE contracts, the customer is more concerned about maintaining a fixed number of employees. Three months helps them to recruit a suitable replacement.
7. *Nowadays, the concept of benching is not practised. When there are not enough resources available, it is difficult to find a replacement, so three-month notice period helps to hire a new candidate* - Fifteen responses received for this. Due to the unavailability of internal resources in the bench pool, it is unavoidable for the employer to hire resources from

external market, so a three-month notice period helps the employer to search and hire new candidates.

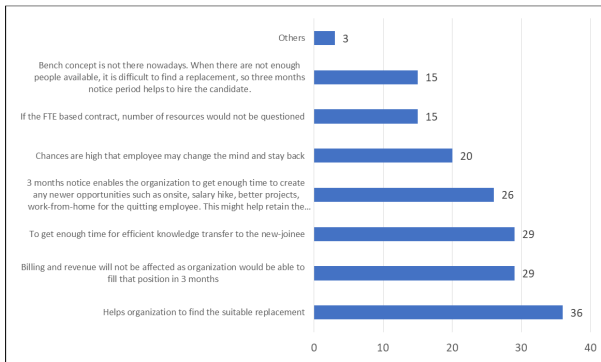


Figure 15. Benefits of three-month notice period to the employers.

To find out the demerits of three-month notice period to the employer, we posed this question to the respondents, ‘Please choose the demerits to the employer (organisation) due to the three-month notice period.’ Six choices were given to choose from to respond and they could also select multiple answers if applicable (Figure 16).

1. *After resignation, the employee works with less motivation and hence there is lower productivity* - Forty-five participants responded with this choice. This is the maximum response and the first most demerit to the employer because of the three-month notice period concept. After resigning, salary hike and performance rating are not applicable to the outgoing employee who is not likely to be motivated to offer better productivity.
2. *Poor performance by the resigned employee may damage the organisation’s reputation* - Thirty-three respondents responded with this, which is the second most option chosen by the respondents. Continuous focus and better productivity are needed to satisfy the customer. The resigning employee may not worry about the performance and its negative consequences.
3. *There is no guarantee employee will give proper KT to the replacement* - Thirty-two responses (almost close to the second most response) were received for this. Which means, though the notice period tenure is three months, does not mean that the resigning employee transfers all the knowledge to the replacement.
4. *Organisation who is hiring candidates may suffer due to three-month notice period, as new employees might not join immediately* - Thirty-two responses (almost close to the second most response) were received for this. New employees may not join at

the expected time as they get multiple offers, which leads to waste of efforts and money for the hiring organisation. As a result, every organisation has to invest much time, effort and money to conduct interviews, complete many internal process and issue offer letters. During the three-month notice period, the resigning employee may get multiple offers and end up joining one of the organisations. The employee has to reject the proposals issued by other employers, which is an injustice to the organizations who have already issued the offer letter to that particular candidate.

5. *It may lead to escalation if the resigning employee is performing badly during the three months* - Twenty-six participants opted for this choice. If the resigning employee does not complete the work in time or complete with the problems or does not respond to the customer’s query, then the customer may try to elevate the issues through the account management team and raise their concern. This situation may lead to dissatisfaction which will affect the business with the customer in future and sometimes may lead to terminate the contract.
6. *Misbehaviour from the employees* - Twenty-one respondents indicated this in their response, which is the bottom-most demerit to the employer. Since performance appraisal and salary increment are not applicable once the resignation is tendered, the resigning employee may behave differently with colleagues, managers and customers, which will affect the organization’s reputation and customer satisfaction.

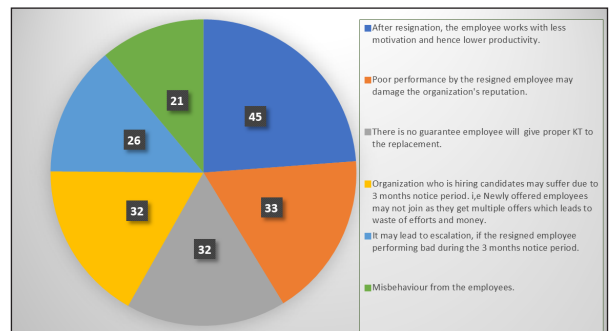


Figure 16. Disadvantages of three-month notice period to the employers.

QUALITATIVE DATA

We received diverse responses for the open-ended question. One of the respondents said, ‘Three-month notice period is unnecessary, and it reduces the good opportunity an employee has.’ A respondent from DXC

said, 'Three-month notice period is the best option. However, it should be a win-win situation for both parties if the resource is very critical and cannot be filled with an alternative resource from the market. By keeping three-month notice period in place, it might be possible to retain the employee. Also, if the current employer is not able to satisfy employee benefits provided by another company, which is going to hire the employee, it is not worth staying the employees for three months; it is better to release him/her if there is no dependency on him/her in the organisation.' An experienced manager expressed his view as, 'There should be a law that forces all jobs with a notice period of 15 days to one month, irrespective of their being government or private, temporary or permanent. Social security and pensions should be a parallel track to reduce the dependency of the current organisation.'

A respondent mentioned the drawback to the employees as, 'A resigning employee will be a bad element in the team. In the three months of notice period, the resigning employee's teammates are likely to be motivated to try to get a job outside of the current organisation. Also, the colleagues may attempt to use the resigned employee as a reference or recommendation to get the job in the new company.'

A senior management professional said, 'As we are moving to centralised structures, I think implementing three-month notice period is very unfair. Employees will lose interest, and they may not be working as effectively during the notice period and KT sessions will not be effective, as the resigning employee would want to maintain the employer's dependence on him until his last working day. So, if an employee wants to leave, companies should be relieving him immediately, within a period of one month or 15 days as most of the companies in the USA and Europe do. If not, the recruiters should start considering the people for a three-month notice period so that there is no opportunity for the employees who wanted to join immediately as they are about to complete their notice period based on the offer from another organization. The company needs someone who can join immediately from the open market. In most of the cases, employees are unsecure because while searching for a job they will not be considered as potential candidates due to the three-month notice period. In some cases, the employee must resign from the current position before he/she can qualify for another job, which is injustice for the current employer as most of the Indian IT organization do not prefer to hire employees coming from another organization because of the three-month notice period; they want someone who can join them immediately. Thus, the employee is forced

to resign from the current job so they can join other companies within 15–30 days. However, if they do not get an offer, then they need to take back the resignation.

'The three months' duration helps an employee to search and find another job. In this practice, companies cannot find a useful resource, which can fit for the position. Because when an organisation focuses on people who are available to join immediately, it would hire people, not a skilled employee. To avoid this issue, either the organisation has to reduce the notice period from three months to 30–45 days or stop recruiting people who can join immediately, that is, in 15–30 days (especially the candidates who are not employed or have already resigned and are serving the notice period). In this case, we can streamline this notice period, which benefits both employees and employers. In my opinion, doing the right thing at the right time is most important.'

A respondent talked about the merits of three-month notice period to the employer and its demerits to the employees, 'It is beneficial for the employers and affects the employees badly. Hence, companies must rethink and change the period to 45 days instead of three months.' Another employee mentioned the KT process and the psychological impact on the employee, 'Three months are too long a period nowadays given the kind of mind-set of the employees and also the methods available for transition.'

'I think two months should be enough for knowledge transition and finding a suitable replacement. Moreover, sometimes if the employee is highly demotivated, it is a waste of money for the organisation to pay' was view of a professional. A manager from an MNC said, 'It is good to standardise and reduce the notice period to make it more employee-friendly. But longer notice periods help in reducing job-hopping intended only for a salary hike.' For the benefits of the employees, another responded said, 'For resignation, companies can fix the notice period at one month and for a layoff it should be three months.' An experienced manager from another MNC mentioned the demerits of the three-month notice period to both the employer and the employee as 'It is not required, and employers get no benefit out of it. Additionally, employers won't get suitable resources when they have immediate requirements as the three-month notice period of other organizations may not permit to hire immediately. It may lead employers to force them to bench resources.'

An HR manager from an IT company said, 'Three-month notice period is in place to get a new resource with a proper skillset. An employer may find it difficult to find skilled resources in less than three months.' A project manager from an MNC mentioned the need and nature

of the three-month notice period: ‘Three-month notice period has come into the picture especially due to higher attrition. The pros and cons of the three-month notice period depend on the relationship between the resigning employee and the manager, and this can make the deal or break it.’

A few more responses:

‘Three months’ notice period benefits both employer and employee as the employee will get a better opportunity, and the current employer gets an opportunity to retain the employees through retention management process.’

‘It should be a standard across the country and common for all IT organisations.’ There should not be any “immediately can join” option unless someone is not employed. This will help to reduce a lot of negative consequences such as employer hiring someone who is not adequately skilled, and three months’ notice period enables employees to resign from the current job and try to find another job. In case they do not get a better opportunity outside, then they take back their resignation.

‘I think two months is a reasonable period that would benefit both parties. This policy would also force organisations to be proactive in identifying a backup plan for any future resignations. Also, the resignee could spend quality time and provide KT without any stress. Only poorly governed organisations think that three months long handover is needed to get a replacement. Also, they should accept the fact that this encourages the inefficient practice of maintaining personal dependence of the employer on the employee in delivering services, which is one of the most significant risks in business. Not many organisations prefer to wait for three months to hire someone, as they expect the new employee to join in 30–45 days maximum. So, your current company also needs to respect the same, because they will not face a similar challenge to get an employee if the notice period is three months.’

HYPOTHESIS AND TESTING

Hypothesis : There is a need to reduce the three-month notice period in the Indian IT industry.

Table 1. Mean and standard deviation of the responses

Questions	Mean	Std Deviation
Three-month notice period in Indian IT organisations is fair	2.18	0.05
If three-month notice period should be there across all IT companies.	2.25	0.11
Three-month notice period policy implemented by a few of the IT organisations (located in India) is due to various requirements	2.53	0.10
Preferred notice period	0.71	0.09

Based on the outcome of all the four questions that belong to the hypothesis “There is a need to reduce the

three-month notice period in the Indian IT industry” it can be evidenced that Three-month notice period is not fair to keep in the Indian IT industry. Majority of the respondents said that it is not fair to keep three-month as the notice period. If organizations prefer to keep, then it should be followed by all Indian IT organizations. The three-month notice period is implemented in organizations without genuine reasons or requirements. Most of the respondents prefer to have one month as the notice period. This is also evidenced by the mean value, which is above average value and closure to the maximum value. The value of the standard deviation is within the acceptable statistical value. By considering all the above facts, it can be concluded that the null hypothesis “There is no need to reduce the three-month notice period in the Indian IT industry” is rejected and the alternate hypothesis “There is a need to reduce the three-month notice period in the Indian IT industry” is accepted.

DISCUSSION AND INTERPRETATION

This section has two sub-sections. One for quantitative data and another for the data received as qualitative data. Fifty-two respondents from 11 IT organisations participated in the survey. Most of the respondents had more than five years’ experience in the industry.

A vast majority of respondents (82.6%) felt that three-month notice period is not fair. It may benefit the employer but not the employee. From the responses received, it can be assumed that more than 70% of the Indian IT organisations follow three-month notice period. In an attempt to understand employees’ preference for a notice period, they indicated that they do not want to have a notice period of more than two months. Most of them preferred 30–45 days. Keeping the same notice period across the globe is the best practice. However, it may not be feasible due to different labour laws in different countries. We attempted to find out the opinion of respondents in this regard: 88.5% of the respondents thought that keeping three-month notice period across the globe as a standard is not possible. We wanted to find out valid requirements for three-month notice period. Sixty percent of the respondents felt that three-month notice period is followed with a few valid requirements whereas 40% of respondents had different thoughts. Sixty percent of the respondents felt that the three-month notice period is followed because of a few valid requirements for the employer and employees, whereas 40% of respondents felt that the three-month notice period had been applied without any valid requirements for the employer and employees. There were four questions related to the merits and demerits due to the implementation of three-

month notice period. Respondents could select multiple options if they felt that there are multiple advantages and disadvantages. From the response pattern, it can be concluded that there are a few benefits to the employer and the employees. However, it is also evident that three-month notice period has some demerits for both.

From the qualitative response, it is understood that the three-month notice period is unnecessary as it reduces the excellent opportunity for the employees. However, the three-month notice period may help the employer to retain the employee through retention management. A resigning employee will be treated badly and also, and the resigned employee may motivate others to find a job in other companies. The resigned employee may not be effective during the notice period, and KT sessions will be non-productive most of the times, and hence three-month notice period will not help. One side, the company wanted employees to join in 15 days when they hire. Another side, they ask the existing employees to leave after three months. This approach will create issues to employees and employer as well. It is a tough job for organizations to hire skilled people in 15-30 days. If they can find someone, they are not adequately qualified. To mitigate this issue, all the Indian IT organizations have to reduce the notice period to 30–45 days or stop hiring people 15–30 days. By doing this, the IT industry can streamline this notice period, which benefits both employees and employers. 45–60 days should be enough for knowledge transition and finding a suitable replacement. For resignation, companies can set the notice period at one month, and for a layoff from the organization side, it should be three months. This approach employees job security and avoid financial risks. The trigger for the three-month notice period is the higher attrition rate. The pros and cons of the three-month notice period depend on the relationship between the resigning employee and the manager and based on that the deal can happen.

Notice period should be a standard across the country and common for all IT organizations. “Immediately can join” concept should go away unless someone is not employed. This will help to reduce a lot of negative consequences such as employer hiring someone who is not adequately skilled and available to join. Standard and the low number of a notice period would benefit both parties. This policy would force organizations to come up with a backup plan for any future attritions. The resignee could spend quality time with full mind and provide KT without any stress. Only poorly governed organizations think that three months long handover is needed to get a replacement. The overall feedback from most of the respondents indicates that the notice period to be 30-45 days.

RECOMMENDATIONS

- Most of the respondents voided that the notice period should be standard across the nation for IT organizations. An association should be formed (like NASSCOM) so that representation from most of the organizations from different functions (HR and business) can be ensured. Even NASSCOM can lead this effort for the benefit of the Indian IT industry.
- An association that adequately represents multiple companies should conduct a conference to hear open feedback from different stakeholders.
- Experts have mentioned that the talent management process to be revised as per the contemporary challenges. Research should be carried out by the association (organization) by involving employees from various organizations and employers.
- Based on the study, the maximum notice period should be defined and agreed upon by all employers, irrespective of their being an MNC or Indian.
- Based on the responses received in this study, it is advisable to keep the notice period as one month. Maximally, it can be 45 days, if required.
- Strictly, all IT organizations should follow the agreed standard notice period, and it should be mentioned clearly in the offer letter issued to the incumbent.
- Most of the respondents felt that the standard notice period process is not followed by the IT organizations because the current labour is not supporting such requirements. Indian labour law should be modified to support this notice period for IT industry so that it becomes legal and to force organizations to follow without deviations. Organizations in violation of the defined and mutually agreed notice period (30–45 days) should be penalized heavily.
- In case of an individual resignation, the notice period can be 30–45 days; however, in case of downsizing or bulk termination of jobs, it should be three months or with three months’ severance pay. This is much needed, as we do not have a social security system in India as in the USA.
- As expressed by the experts, it is critical that Indian IT organizations to invest their efforts to come up with the alternate strategy for enhanced talent acquisition and talent management so that the recruitment for would be possible in a month time.

CONCLUSION

Notice period is one of the crucial factors that play a vital role between the employer and employee in an organisation. The employer always thinks about filling the

position and ensuring the service goes good without any negative impact when someone leaves the organisation. An employee still feels the need to be released smoothly from the company and receive all due settlements when they leave the organisation. The tenure of the notice period should be convenient and appropriate for both the employer and employee. Based on our research, we suggest that a preferable notice period is 30 days, which can go up to maximum of 45 days if required. However, it is essential to form an association or use an existing organisation such as NASSCOM to call a conference involving both parties and come to a decision. The revised notice period can be then finalised and agreed upon and it should be followed by all IT organisations in India.

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An in-Depth Study is conducted on the Segmented Genes of the Cancer Causing Helicobacter Pylori

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Abstract—*Helicobacter Pylori* is a kind of bacterium that, when present in human bodies, has the potential to cause persistent gastritis. The inner lining of the stomach can become inflamed, a condition known as gastritis. It is also possible that this bacterium has a part in the formation of stomach ulcers and stomach cancer. At first, this bacteria did not cause any harm and behaved exactly as one would anticipate it would. However, as a result of certain alterations in the structure of the genome (a process that is known as genetic mutation), it turned out to be dangerous. To this day, researchers have pinpointed 27 distinct gene alterations that, if left unchecked, might eventually result in the development of cancer. These genes have numbers that vary from HP0821 all the way up to HP0847 connected with them. Finding out what had occurred to cause the shift in those 27 genes was the most significant objective that we aimed to achieve with our thesis research. The algorithm that we conceived of and put into action for this specific objective was developed with the help of the Java programming language. This function receives its input from a single file and generates a total of six additional files as its output. We make changes to the nucleotide sequences of 27 genes in order to zero in on the specific location in the genome where mutations took happened. After that, we made use of a program called BLAST to look for genes in other bacteria that were similar to the ones we were looking at. We discovered that *H. pylori* had the highest similarity, which came in at a whopping 100%. In addition, we found a similarity of 90% with the *D. desulfuricans* ND132 chromosome as well as 85% with the *Aeromonas hydrophila* SSU genomic scaffold supercont1.1.

Keywords: *Helicobacter Pylori*, chronic gastritis, BLAST, and nucleotide sequences and *D. desulfuricans*,

1. INTRODUCTION

One of the most common types of bacterial illnesses, *Helicobacter pylori* (*H. pylori*) is present in more than half of the world's population [1]. But there are significant

differences from one place to another. Even though the condition is frequently picked up in childhood, if it is not treated properly, it can last a lifetime. This is true even though the majority of instances occur in young children. *H. pylori* can survive in the challenging conditions of the human stomach because it carries many genes that produce virulence. It can therefore survive and even flourish in this environment. One of the human infections that has best adapted to humans is the *H. pylori* bacterium. These virulence genes are absolutely necessary for the bacteria to be able to maintain a very effective and long-lasting infection; their significance goes much beyond what is technically necessary for the bacteria to survive. This is because the presence of these genes allows it to maintain a highly strong and protracted infection. The bacteria *Helicobacter pylori* is able to get closer to the stomach epithelial cells despite the presence of gastric acid because of the abundance of sheathed flagella and the presence of the enzyme urease. The bacterium is thereby shielded from the stomach's acid. OMPs and adhesins, which allow adhesion to gastric epithelial cells, are used by *H. pylori* to create a long-lasting colony in the stomach mucosa. This allows *H. pylori* to adhere to the stomach's epithelial cells.

They adhere to the mucosal cells of the stomach to accomplish this. A series of virulence genes, which serve as the blueprints for effector proteins that directly harm the gastric epithelium, are also present in *H. pylori* [2,3]. Additionally, *H. pylori* has been connected to human gastritis [4,5]. Major consequences of *H. pylori* infection include peptic ulcer disease (PUD), gastric cancer (GC), and mucosa-associated lymphoid tissue (MALT) lymphoma, but only 10%–15% of those infected [4,5]. Only about 10% to 15% of people with *H. pylori* infection go on to develop chronic active gastritis, despite the fact that this condition might result from the illness. Chronic active gastritis is a disorder that has been associated to the bug *Helicobacter pylori*. Despite the fact that *H. pylori* is a proven carcinogen, its global prevalence warrants public

health worries (class I). 2018 was predicted to see more than a million (103,370) new cases of GC worldwide, ranking it as the sixth most prevalent kind of cancer in both men and women [6]. It will surpass melanoma to become the sixth most prevalent cancer in both men and women worldwide if the predictions come true.

Young people's *H. pylori* infections differ significantly from adult infections in a number of important ways. Environmental factors like smoking are thought to play a much smaller effect in the progression of disease in children than they do in the development of disease in adults. This is so that children's immune systems can continue to learn how to stave against diseases. *H. pylori* infection has been shown to develop throughout childhood in both industrialized and developing countries [7]. This is true whether a country is officially considered an industrial power or not. *H. pylori* infection occurs simultaneously in both situations, despite the fact that prevalence rates in children vary depending on a number of factors (including gender, age, low socioeconomic position and family education, poor hygiene, household congestion, and geographical locations). Because the sickness *Helicobacter pylori* (*H. pylori*) is brought on by a bacterium that lives in the stomach, this is true. The most typical types of gastritis in adults are atrophic gastritis and intestinal metaplasia, whereas nodular gastritis is the most typical kind in children [7]. The most common type of gastritis in children is nodular gastritis. Although *H. pylori* colonization and the virulence gene repertoire are similar in both age groups [8], it is believed that immune responses are downregulated in children, which accounts for their lower levels of stomach inflammation and lower incidences of severe clinical outcomes. This is true even though children typically experience stomach irritation that is less severe than adult patients.

Our team has thoroughly read, analyzed, and discussed several studies examining *Helicobacter Pylori*. These publications examined *Helicobacter pylori*, its transmission, and its effects on individuals. They also talked about how it affected diverse communities. The authors of those studies, however, did not attempt to identify the specific mutations that transformed *H. pylori* into a carcinogen. Our reasoning relies heavily on learning more about these *H. pylori* mutations.

2. MATERIALS AND METHODS

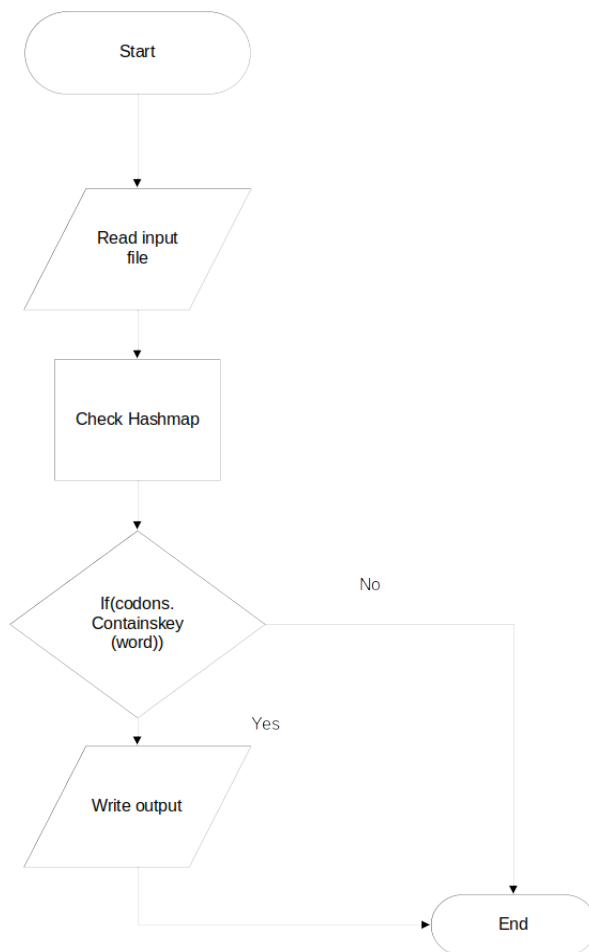
The main goal of our thesis research was to determine where the 27 gene shift first occurred. The algorithm we created and utilized to get there was significantly aided by Java. The data in a single file is copied into six others as part of this process. The mutation sites in the genome

are tracked by modifying the DNA sequences of 27 genes. This allows us to identify the specific location in the genome where the change occurred. Then, we used BLAST to find orthologous genes in different bacteria. The following algorithms and flowcharts will demonstrate:

Because of the availability of clinical information explaining their linked stomach pathology in the published literature or genome descriptions, we were able to obtain our data from the NCBI Genomic database at the National Center for Biotechnology Information. **Table 1** (based on HP0821 to HP0847)

Algorithm:

- Step 1: Start
- Step 2: Take input, output, codon variables
- Step 3: Read input file
- Step 4: Then check Hashmap key
- Step 5: If key value is equal to the input file
- Step 6: Then value write in another output file
- Step 7: Stop



Flow chart for the algorithm

Table 1 : Table for translated gene (From HP0821 to HP0847)

Gene no	Translated
0821	MADLLSSLKLNLPNSSGVVYQYFDKNRQLLYIGKAKNLKKRIKSYFSIRNNEITPNHRASLRIQMMVQKQIAFLETILVENEQ-DALILENSLIKQLKPKYNILLRDDKTYPIYIMDFSTDFPIPLITRKILKQPGVKYFGPFTSGAKDILDSLYELLPLVQK-KNCIKDKKACIFYQIERCKAPCENKITKEEYLKIAKECLEMIENKDRLIKELELKMERLSNNLRFEALYRDRIAKIQKI-APFTCMDLAKLYDLDFAFY GASNKAVLVKMFMRGGKIISSAFEKIHSLNGFDTDEAMKQAIINHYQSHLPLMPE-QILLNACSNETLKEQFISHQYSKKIALSIPKKGDKLALIEIAMKNAQEIFSQEKTSNEDLILEEARSLFKLECMPEY-RVEIFDTSHHSSSQVGGMVVYENAFQKNSYRRYHLKGSDEYTMSELTRRALDFAKEPPNWLVIDGGRAQLNIA-LEILKSSGSFVEVIAISKEKRDSKAYRSKGGAKDIHHTPSDFTFLKLPSPDKRLQWVQKLRDESHRYAINFHRSTKLNKMK-QIALLKEKGIGEASVKLLDYFGSFEAIEKASEQEKNNAVLKKRI
0822	MKKRLNIGLVGLGCVGSAVAKILQENQEIIKDRAGVGIGIKKAVVRDVKKHKGYPFIEISNDLESIEDEEIDIVVELMG-GVEAPYLLAKKTLAKQKAFVTANKAMLAYHRYELEQTAKNTPIGFEASVCGGPIIKALKDGLSANHILSFKGILNGTSNY-ILSQMFKNQASFKDALKDAQHLGYAELNPEFDIKGIDA AHKLLILASLAYGIDAKLEEILIEGIEKIEPDDMEFAKEF-GYSIKLLGIAKKHPDCIELRVHPSMIKNECMLSKVDGVMNAISVIGDKVGETLYYGAGAGGEPTASAVISDIIERIARKKSS-LMLGFETPQKLPKPKKEIICAYARLLVSDKGVFSQISAILAQNDISLNNVLQKEILHSNKAKILFSTHTTNEKSML-NALKELENLQSVLDTPKMIRLEN
0823	MRFLNNKHREKGLKAEEEACGFLKSLGFEMVERNFFSQFGEIDIILKKGVLHFIEVKS GENFDPYIAITPSKLLKMIKTIR-CYLSQKDPNSDFCIDALIVKNGKFELLENITF
0824	MSHYIELTEENFESTIKKGVALVDFWAPWCGPCKMLSPVIDELASEYEGKAKICKVNTDEQEELSAKFGIRSIPTLLFTKD-GEVVHQLVGVQTKVALKEQLNKLLG
0825	MIDCAIIGGGPAGLSAGLYATRGGVKNVAVLFEKGMPGGQITGSSEIENYPGVKEVVSGLDLDFMQPWQEQCFR-FGLKHEMTAVQRVSKKDSHFVILAEDGKTFEAKSVIIATGGSPKRTGIKGESEYWGKGVSTCATCDGFFYKNKEVAVLG-GGDTAVEEAIYLANICKKVYL IHRRDGFRCAPITLHAKNNDKIEFLTPYVVEIKGDASGVSSLSIKNTATNEKRELV-VPGFFIFVGYDVNNAVLKQEDNSMLCKCDEYGSIVVDFSMKTNVQGLFAAGDIRIFAPKQVCAASDGATAALSVISYLE-HH
0826	MRVFAISLNQKVCDFLGVFRDRTTLLNSINATHHQAIQFDIAISKTFEGGLHPLVKKHLHPYFITQNIKDMGITNLISEVS-KFYALKYHAKFMSLGEGLCYASHYSLWEKCIELNEAICILEDITLKEDFKEGLDFLEKHIQELGYIRLMHLLYDASVK-SEPLSHKNHEIQERVGIKAYSEGVGTQGYVITPKIAKVFLKCSRKWVVPVDTIMDATFIHGKLVNLVLPQFVIADDEQISTI-ARKEEPPSPKIALMRELHFYKLYWQFV
0827	MRNIYVGNLVYSATSEQVKELFSQFGKVFNVKLIYDRETKPKPGFGFVEMQEESVSEAIKLDNTDFMGRITIRVTEAN-PKKS
0828	MEHRVFTIANFFSSNHDFITGFFVVLTAVLMFLISLGASRKMQMPMGLQNVYESIISAILSVAKDIIGEELARKYFPLAGTI-ALYVFFSNMIGIHPGFESPTASWSFTLVLALIVFFY YHFEGIRVQGGFFKYFAHFAGPVKWLAPFMFPIEIIHSF SRIVSLSFRL-FGNIKGDDMFLMLLLVPWAVPVAPFVLFMGLQAFVFMILTYVYLAGAVLTDDEGH
0829	MRILQRALTFEDVLMVPRKSSVLPKDVSLKSRLTKNIRLNIPFISAAMDVTVEHKTAIAMARLGGIGIVHKNM-DIQTQVKEITKVKKSESGVINDPIFIHAHRTLADAKVITDNYKISGVPVDDKGLLIGILTNRDVRFETDLSKKVGDVMT-KMPLVTAHVGISLDEASDLMHKHKIEKLPVVDKDNVLKGLITIKDIQKRIEYPEANKDDFGRLRVGAAIGVQLDRAEM-LVKAGVDALVLSAHGHSANILHTLEEIKKSLVVDVIVGNVVTKEATS DLISAGADAIAKVGIGPGSICTTRIVAGVGMPQV-SAIDNCVEVASKFDIPVIADGGIRYSGDVAKALALGASSVMIGSLLAGTEESPGDFMIYQGRQYKSYRGMGSIGAMTK-GSSDRYFQEGVASEKLVPEGIEGRVPYRGKVSMDMIFQLVGGVRSMSGYQGAKNILELYQNAEFVEITSAGLKESHVH-GVDITKEAPNYYG
0830	MITLKAQSLSQDELETLKNEIDAKVRASDLNAYIKAPSLNGASAKGVPILIKDNISVKGWEITCSSKILEGYVAPYHAS-MENLHQNSMAGFGLSNMDEFAMGSTTESSCYGITKNPRDKNRVPGSSGSAAVAGGLAVAALGSDTGGSSIRQPASY-CGCVGLKPTYGRVSRYLIAIYCSSFDQIGPITQNVEDASILFDAISGYDSKDDSTPTQTFKLNLRDKRFKIAVLM DHIK-DASNEVQLAYENTL KALKEMGHEIVEKMLDSHQISIYIISMAEASSNLARFDGVRVYGRRAQNIKDLKELYLKS RSEGF-GDEVKRRIMLGNFVLSGGYDAYYLKAQQMRLIIEQYKNKIFEEVDLIFTVPVAPSAHLFNHASPLEMYLSDIYTIGAN-LSGLPALSLPVAKDPLGLPIGMQFIKAFDEQSLLDVSYALEQELDLKLD
0831	MVLKNAIALTGGIGTGKSTTIKILESQGYKILDADKIAHQLLQEHRFKIAQHFGSDILEKDILNRKKGAIQVQDAHELK-WLEDFLHPLREHMLKKAYELEKNHQAYFLDIPLFFEVGGKCYPSVKVVLVYASRALQIERLLERDKLKEAAILQRLAC-QMDIEQKRAMSDYIIDNSSKDLNKQVRFLLKTL
0832	MWITQEITPYLRKEYTIEAKLLDVRSEHNILEIFKSKDFGEIAMLNRQLL FKNFLHIESELLAHMGGCTKKELKEVLIVDG-FDLELAHQLFKYDTHIDFVQADEKILDSFISFFPHFHEVKNNKNFTHAKQLLDLIDIKKYDLIFCLQEPDIHRIDGLKRM-LKEDGVFISVAKHPLLEHVSMQNALKNMGGVFSVAMPFVAPLRILSNKGYIYASFKTHPLKDLMTPKIEALTSVRYYNE-DIHRAAFALPKNLQEVFKDNIKS
0833	MFLVKKIGVVIVVLIGFLACSQERFIQLQKKAQE QENDGSKRPSYVDS DYE V FSETIFLQNMVYQPT EERDSFAQLT-KDENDSFNPETSVILLNEPSDSDTKNPLNQNESNTNTANNDTKNPFLLYKPKRKTDPK LIEYSQQNFYPLKD-GDIMMSKEGDQWLIEIKSKALKRFLKQNDKDRQIQTFNNDTKTQIAQFKGISSYVYTTNNSDLSLRPFYEFLLKKS-DDFYTIGDKALDAIEISKQMVLLKXHSTDKLDSQHK AISIDLDFKKERFSNTELFLECQS

(Contd...)

0834	MNTSHKTLKTIAILGQPNVKGSSFLNRLARERIAITSDFAGTTRDINKRKIALNGHEVELLDTGGMAKDALLSKEIKALNLKAAQMSDLILYVVDGKSPSDEDLKLFRVFKINPNCFLVINKIDNDKEKERAYAFSSFGMPKSFNISVSHNRGISALIDAVLSALDLNQIIEQDLADILESLET-PNNALEEEIIVGIIHRVNVKGSSLLNALTKKERSLVSSVAGTTIDPIDETILIGDQKICFVDTAGIRHRGKILGIEKYALERTQKALEKSHIALLVLDVSAFPVELDEKISSLADKHSGLIILVNLKWDIRYAPYEEIATLKRKRFLYAPVITTSCLKARHIDEIKHKIIEVYECFSKRIPSTLLNSVIN-QATQKHPLPSDGGKLVKVYYATQFATKPPQISLIMNRPKALHFSYKRYLINTLRKEFNFLGTPLILNAKDKKSAQQN
0835	MNKAEFIDLVKEAGKYNKREAEAEISAFTLAVETALSKGESVELIGFGKFETAEQKGEKGVPGSDKTYKTEDKRVPKFKPGK-TLKQKVEEGK
0836	MPMLRLHTAFFGINSLLVASLLISGCSLFKKRNTNAQLIPPSANGLQAPIYPTNFTPRKSIQPLPSPRLENNDQPVISSNPTNAIPNTPIPTPN-NVIELNAWAWAWLQNPFFHLPKPLW
0837	MGMGVAPESTISPSQALALAKRAAIVDGYRQLGEKMYGIRVNAQDVTVKDMVLQNSVIKTRVNALIRNAEITETIYKDGLCQVSMELK-LDGRUIVYRILSGARG
0838	MRYFRSAFLFFMTLFFASCSPKHPFSKQTPKTRQIRQEEARKKREETLNALRQFRILIYINTPVFRFYDYGTIKTDKDHNIETV-LYKLSQRVGDYIMTKRNICFSQKCSAKWIAARDLFGKVSYGDLFDDIVLGRDIFKGLGKRHLTPEYVIQRFQKSGEIIYERKNGLISFQN-LTQKIAIRIEPYEPLQDLEDNENADSELQ
0839	MKNFSPLCCFKLKRHLIALSLPPLSYANGFKIQEQLSNGTALGSAYVAGARGADASFYNPANMGFTNDWENRSEFEMTTTVINI-PAFKFQVPTTNQGLYSVSTLQIDKSSQNLGSIINTIGLSNILKALGNTAATNGLSQAINRVQGLMNLTNQKVVTASKPDTQIVNGWT-GTTNFVLPKFFYKTRTHNGFTFGGSFTAPSGLMKWNGKGGEFLHDVFMIMVELAPSMSYTVNKHFSVGVGLRGLYATGSFNNTVYV-PLGASVLSAEQILNLPNNVFADQVPSNMMTLLGNIGYQPALNCQKAGGMSDQSCQEFYNGLKKIMGYSGLIKASANLYGTTQVVK-SNGQGVSGGYRVGSSLRVFDHGMFSVYVNSSVTFNMKGALVAITELGPSLGSVLTGSLNINVSPLQTLSLAYAHQFFKDHRLRIEIVFERT-FWSQGNKFLVTPDFANATYKGLSGTVASLSDSETLKKMVGLANFKSVMMNMGAGWRDNTNTRFRLGVTYMGKSLRLMGAIDYDQAPSPQDAI-GIPDSNGYTVAFGTKYNFRGFDLGVAGSFTFKSNRSSLYQSPNIGQLRIFASLGYRW
0840	MPNHQNMLDNQTLITGGTSGFGKCFVRKVLDTTNAKKIIVYSRDELKQSEMAMEFNDPRMRFFIGDVRDLERLNYALEGVDCIHAAL-KHVPPIAEYNPLCIKTNIMGASNVINACLKNAISQVIALSTDKAANPINLYGATKLCSDKLFVSANNFKGSSQTQFVSVRYGNVVGSRGVS-VPFKFLVQNKASEIPTDIRMTRFWITLDEGYSVTLKSLKRMHGEIFVPKIPSMKMTDLAKALAPNTPTKIIGIRPGEKLEHEVMIPKDESH-LALEFEDFFIHOPTISFQTPKDYTLTKLHEKGQKVAPDFEYSSHNQWLEPDDLKLL
0841	MNFMLEDLFLRLENKRVLVLLVSGSIAAYKSELEVRLLFKSGASIQVVMKSGAKKFIKPLSFEALSHHKVLHDRNEKWYNNHQNALHH-NHIACAANADLLIFAPLSTNSLSKIAHALADNIVSATFLACASPKILAPSMNTNMLNSPITQSNLKRKLDNSHILDTKNALLACDTKGDGA-MAEPLLEIFKAAQTLKDAYFENREIVVMGGASIEKIDSVRTISNLSGQASALALALYFKGAKVTLIASNFPPTLPKEITSVLSDTASYE-NALNSAANLQKHALKPLLFNLAASIDYVPKTSFNKYLKKSIEGTLNIECVQNKDILLVSNINQFVKIGFKAEDNQNAIKNAQNLKPKF-DNGKDCSVVALNLIKDSRPFGLSELENELWLFSHHKQKIPSMNKLEASFILDFIKDNAL
0842	MLEALNALNQLNALHSKNATHHFAALPILLKVLEKQDKDLFLLQVGNRIIPTKSEQELKINQPYFATMQRNQLGDIVKNLVPAPKILDALD-DLPVLEMKQIKELSGKDNTPLEKEYKELLSEKLIHAKSSQEFNTANMLLSLQSQVLSFVENERKKTFLQVKAKKQSVDFYALYPNLGEI-GGVYILKEKEKQLFLKTTLQRTKEVLKEAQTLLGFSSVEIVCEKTPMLFAFEERLLDTIG
0843	MFDADCLKLMFVAGSQDFYHIKGGKNDRINALDLELALQSKITAFQFRQKGDALQDPTQIKQLAMKCQKLCQKGAPFVNDVQVLA-LELKADGVHVGQEDMAIEEVITLCKKRQFVIGSVNTLEQALKARHLDAVAYLVGVPIFPTPSKKDKQVVGVELLKKIKDSGIKKPLIAIGGIT-MHNAPKLRREYGGIAVISIAIAQAKDKALAVGKLLNNA
0844	MVKIYPQVLSIAGSDSGGGSGIQADLKAFTLQVFGTGVITCITAQNTQGVHGVYPLSVESVKAQILAIRDDFSIKAFKMGALCNAQIIEC-VADTLETCDGFLCNDVDPVMVAKNGALLLEEEAILSLKRLLPITHTLLTPNLPEVYALTGVQVRDDKSASKAMGVLRDLGVKNNAVIK-GHTEHFQCEYNSVLDLPEMAEFKLNARFNTKNTHTGTCTLSSLIVGLLAQGLDLKNAISKAGLTLNIGHGHGLVNSIKELV
0 845	MDFCKIKEILRRVLKELRQKRLVHNITNYVAAQFVANGLLALGASPLMSDAIDEMRDLAKISDALAINIGTLNDRAILCAKEAI-KHYKALNKPIVLDVPGCSASALRHDTSLLELLKSGGISALRGNAAELGSLVGISCESKGLDSDNDAATPVEIHKLAAQKYSVIAVMTGKTDY-VSDGKKVLSITGGSEYLALITGAGCLHAAACASFLSLKDPDLSMAQLCALYKQAAAFNAQKKVLENNGNSGSLFYFLDALSLPIELEN-SLIKEW
0846	MQVIHQYSNKGKGYQNRDYDVSILVNGPLVHVVELKKRGVAIREAFNQIKRYKRDSFSAEDGLDFVQIFVISNGTSSKYYSNTTRIAQLE-KNHKADTFEFTNYWADSKNHNIEDLMDFAKFAKRSLLNVLTICYVFTSEVLLVMRYPYQIVAAERILEKIKTAQNSKTKNQSKGYI-WHTTGSGKTLTSFKSATLAKELESVSKVLFVVDKRDLDYQTMKEYDKFQKDCANSNTSTKILKEQLEDNSNAKIITTIQKLDKFKVSKH-GHAIFNVMIFFDECHRSQGLSMHQAITKAFKYHLFGFTGTPIFAANCDDKNPLGTTEQKFKGCHQYTIIDAIRDKNVLPFRVEYHN-TIKAKEDIKDNKVRADDEKNALLDTRRIKEITKILERFNQATKNKFNLSILACSSIEALKKYYQAFKEEKHDLKIAAIFYSANEED-TLEDENNESACRLDKSSRDFLEGAIAADYNGMFGVSFDTSQKQFQSYKDLKQKMKERKIDLLMMVNMFLTGFADATRLNTLVWDKNLKY-HGLIQAFSRANRILDSVKTHGNIVCFRDLQDLNDALMLFGNKDAQSIALLRKYEDYLKGYTDNNKEYEGYEGLIKRLLETFPLKEPIV-S-ESQKDKFIKLFKILKLENILNSFENFKKDDYINPRDFQDYQSKYLDYDAMRSEKGGKDEEINDDLIFEIELIKQVEVNIDYILNLIEEFAKEH-GVEIQGVYTKIEPIINSSIELRNKKDLIMDFIDKYNKDQEVHAHFQDYIHKREEFQNIIEENRNLNEEKAYSFMQHAFKGGVEISFGTEFPK-IIEEKPSMFGKNSRYQEVKEKVAASLSRFFHRFCDLTSAIFKKN EVKDEVNEK
0847	MSYETIAESNESTVVAEFHSSNEKKALMRAKQS

3. BLAST

The National Center for Biotechnology Information (NCBI) is responsible for the upkeep of the utility known as BLAST (NCBI). When searching for “hits” in a nucleotide or amino acid sequence database, BLAST is the tool that is employed. One or more high-scoring segment

pairings are required for a BLAST hit to be considered (HSPs). A HSP is defined as a pair of sequence fragments with an alignment that is maximal in the local context and a similarity score that is greater than some criterion value. Blast all is a program that may be downloaded from the NCBI and used to conduct BLAST searches on data sources that can be BLAST-ed, such as GenBank.

3.1 Input:

You have the option of receiving the weight matrix, and the sequences can be downloaded in either the FASTA or the Genbank format, depending on which one is more convenient for you. In addition, there is a selection that may be made that gives one the opportunity to get the weight matrix.

3.2 Output:

The results of a BLAST search can be given in a number of different formats. Formats such as HTML and plain text as well as XML are included in this list. HTML is used as the default format for output when dealing with the NCBI website. The results of running a BLAST query on NCBI are presented in a graphical format that displays the hits that were discovered, a table that displays sequence identifiers for the hits along with data related to scoring, and alignments that compare the sequence of interest to the hits received along with the BLAST scores that are associated with each of these.

3.3 Uses of BLAST

BLAST can be utilized in a variety of contexts thanks to its adaptability. The identification of species, the construction of phylogenies, the mapping and comparison of DNA, and the discovery of domains are all examples of these processes. Here, we performed a search for similarities using BLAST on approximately 27 genes (ranging from HP0821 to HP0847), and we have exhibited some of the results, such as the graphical depiction of the HP0821 gene, which can be found in Figure 3.1 and Figure 3.2, and Figure 3.4 respectively.

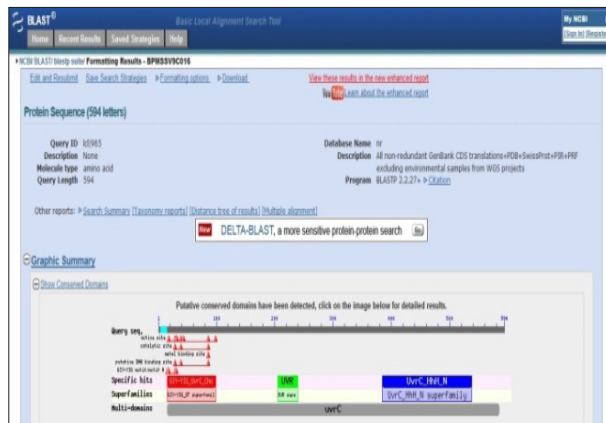


Figure 3.1: Main Page for BLAST

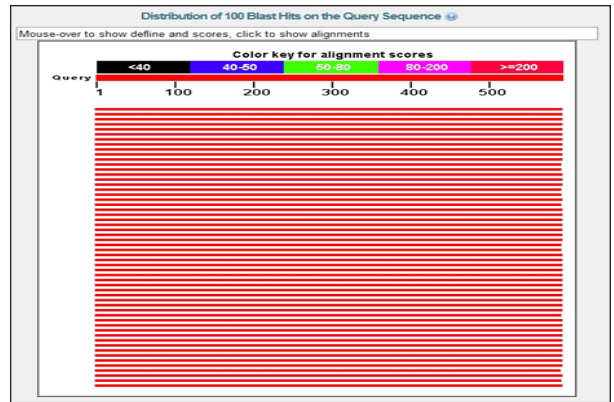


Figure 3.2: A Representation in Graphic Form Display of the HP0821 gene in graphical form

Accession	Description	Hit score	Total score	Query coverage	E-value	Hit length	Links
ZP_102525.1	exonuclease ABC subunit C [Helicobacter pylori 26895] >ref YP_006893	1122	1217	100%	0.0	100%	
ZP_1161772.1	exonuclease ABC subunit C [Helicobacter pylori R038] >gi E091509.1	1102	1202	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori Hp P-15] >ref ZP_15025	1102	1202	100%	0.0	99%	
ZP_1495931.1	exonuclease ABC subunit C [Helicobacter pylori Hp H-45] >gi E091965.1	1102	1202	100%	0.0	99%	
ZP_1495911.1	exonuclease ABC subunit C [Helicobacter pylori Hp H-27] >gi E091961	1101	1201	100%	0.0	99%	
ZP_1495931.1	exonuclease ABC subunit C [Helicobacter pylori N6499] >gi E091941	1100	1200	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori K120] >gi E091941.1	1100	1200	100%	0.0	99%	
ZP_1495911.1	exonuclease ABC subunit C [Helicobacter pylori HP04_438_A02C1]	1100	1198	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori Ind07] >gi ADU79748.1	1100	1198	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori N6499] >gi E091941	1100	1196	100%	0.0	99%	
ZP_1495911.1	exonuclease ABC subunit C [Helicobacter pylori Hp H-45] >gi E091965	1100	1195	100%	0.0	99%	
ZP_1495911.1	exonuclease ABC subunit C [Helicobacter pylori R0496] >gi E0919713	1100	1195	99%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori L0494975] >gi E091943	1100	1195	99%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori A04417] >gi E091911	1100	1194	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori A04417] >gi E091911	1100	1193	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori F32] >gi E091971.1	1100	1193	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori N6499] >gi E091941	1100	1192	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori P12] >gi E091971.1	1100	1192	99%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori B8] >gi E091971.1	1100	1192	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori Hp H-11] >gi E091965	1100	1191	99%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori Hp A-25] >gi E091971.1	1100	1191	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori Hp A-26] >gi E091971.1	1100	1191	100%	0.0	99%	
ZP_1495921.1	exonuclease ABC subunit C [Helicobacter pylori CPY1902] >gi E091941	1100	1190	100%	0.0	99%	

Figure 3.3: Similarity result for Graphical representation of Nucleotide Blast for HP0821

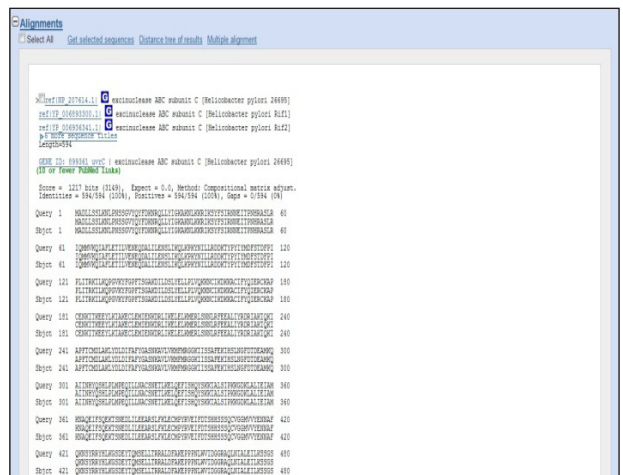


Figure 3.4: Alignment Score for HP0821 gene

4. RESULT AND DISCUSSION

We start by changing the order of the nucleotides, and then we irradiate the products of this process. During our investigation, we came across many different types of search results. Table 2 has the following things, and their explanations are given below:

Table 2: Similarity Search Result

Gene no	Part	Accession	Species	Query Coverage	Max Indent		
0821	1	NC_018938.1	<i>H. pylori</i> Rif2 chromosome	99%	80%		
		NC_018939.1	<i>H. pylori</i> 26695 chromosome	99%	80%		
		NC_017372.1	<i>H. pylori</i> India7 chromosome	100%	80%		
		NC_017761.1	<i>H. cinaedi</i> PAGU611	3%	88%		
	2	No Significant Similarity found					
	3	NW_003846802.1	<i>Sarcophilus harrisii</i> chromosome 6 unlocalized genomic scaffold	2%	92%		
	4	No Significant Similarity found					
	5	NC_017361.1	<i>H. pylori</i> SouthAfrica7 chromosome	98%	79%		
		NC_009707.1	<i>C. jejuni</i> subsp. <i>doylei</i> 269.97 chromosome	10%	77%		
		NC_018709.2	<i>C. jejuni</i> subsp. <i>jejuni</i> PT14 chromosome	9%	77%		
		NC_018521.1	<i>C. jejuni</i> subsp. <i>jejuni</i> NCTC 11168-BN148	9%	77%		
		NC_017280.1	<i>C. jejuni</i> subsp. <i>jejuni</i> MI chromosome	8%	79%		
		NZ_CM000854.1	<i>C. jejuni</i> subsp. <i>jejuni</i> 1336 chromosome	5%	82%		
	6	No Significant Similarity found					
	0822	1	NC_017361.1	<i>H. pylori</i> SouthAfrica7 chromosome	100%	78%	
			NC_014780.1	<i>Anolis carolinensis</i> chromosome 5	2%	100%	
		2	No Significant Similarity found				
		3	No Significant Similarity found				
		4	No Significant Similarity found				
		5	NC_017367.1	<i>H. pylori</i> F57	99%	80%	
NC_017368.1			<i>H. pylori</i> F16	99%	80%		
NC_011333.1			<i>H. pylori</i> G27 chromosome	98%	79%		
NC_017742.1			<i>H. pylori</i> PeCan18 chromosome	98%	78%		
6		NC_017955.1	<i>Modestobacter marinus</i>	3%	91%		
0823		1	No Significant Similarity found				
		2	No Significant Similarity found				
	3	No Significant Similarity found					
	4	No Significant Similarity found					
	5	No Significant Similarity found					
	6	No Significant Similarity found					

(Contd...)

0824	1	NC_017192.1	<i>Arcobacter sp.L</i>	81%	80%
		NC_010519.1	<i>H.somnus 2336 chromosome</i>	34%	77%
		NC_008309.1	<i>H.somnus 129PT chromosome</i>	34%	77%
		NC_008593.1	<i>C.novyi NT chromosome</i>	31%	82%
		NZ_JH815491.1	<i>B.fragilis 638R</i>	26%	83%
		NC_015696.1	<i>Francisella sp. TX077308</i>	13%	93%
	NC_011852.1	<i>H.parasuis SH0165 chromosome</i>	9%	100%	
	2	NC_015138.1	<i>A.avenae subsp.avenae ATCC 19860 chromosome</i>	49%	75%
		NC_019386.1	<i>Thermus oshimai JL-2 chromosome</i>	34%	77%
		NC_017532.1	<i>P.stutzeri DSM 4166 chromosome</i>	12%	97%
		NC_011901.1	<i>Thioalkalivibrio sulfidophilus HL-EbGr7 chromosome</i>	11%	100%
		NC_009937.1	<i>A.caulinodans ORS 571 chromosome</i>	10%	100%
	3	NC_007802.1	<i>Jannaschia sp.CCSI chromosome</i>	9%	100%
		NC_014166.1	<i>A.nitrofigilis DSM 7299 chromosome</i>	74%	76%
NC_013512.1		<i>S.deleyianum DSM 6946 chromosome</i>	35%	80%	
NC_017620.1	<i>S.suis D9 chromosome</i>	24%	83%		
	4	NZ_GL890571.1	<i>Lachnospiraceae bacterium9 1 43BFAAgenomic</i>	9%	100%
		NC_012877.1	<i>Sorghum bicolor chromosome8</i>	37%	82%
		NC_016134.1	<i>B.distachyon strain Bd21</i>	36%	82%
		NC_007519.1	<i>D.alaskensis G20 chromosome</i>	13%	93%
	5	NC_007948.1	<i>Palaromonas sp.JS666 chromosome</i>	11%	95%
		NC_019439.1	<i>Anabaena sp. 90 chromosome chANA02</i>	35%	82%
	6	NZ_JH815491.1	<i>B.fragilis HMW 615 genomic scaffold supercont1.1</i>	26%	88%
		NC_015696.1	<i>Francisella sp. TX077308 chromosome</i>	11%	97%
		NC_019386.1	<i>Thermus oshimai JL-2 chromosome</i>	37%	80%
		NC_015138.1	<i>A.avenae subsp. Avenae ATCC 19860 chromosome</i>	26%	84%
	NZ_CM001161.1	<i>R.sphaeroides WS8N chromosome chr1</i>	11%	97%	
	NC_010694.1	<i>Erwinia tasmaniensis Et1/99 chromosome</i>	10%	100%	
0825	1	NC_017737.1	<i>H.cetorum MIT 00-7128 chromosome</i>	99%	80%
		NC_015674.1	<i>H.bizzozeronii CIII-1</i>	25%	77%
	2	NC_018080.1	<i>P.aeruginosa DK2 chromosome</i>	16%	81%
		NC_017548.1	<i>P.aeruginosa M18 chromosome</i>	16%	81%
		NC_008340.1	<i>A.ehrlichii MLHE-1 chromosome</i>	12%	86%
		NC_016812.1	<i>Sinorhizobium fredii HHI103</i>	9%	86%
		NC_016830.1	<i>P.fluorescens F113 chromosome</i>	3%	100%
	3	NC_017735.1	<i>H.cetorum MIT 99-5656 chromosome</i>	94%	77%
		4 No Significant Similarity found			
		5	NC_015674.1	<i>H.bizzozeronii CIII-1</i>	65%
NZ_DS995286.1			<i>C.bacterium GD 1 scf_1106149034639 genomic scaffold</i>	55%	73%
6		NC_008782.1	<i>Acidovorax sp. JS42 chromosome</i>	14%	84%
		NC_018080.1	<i>P.aeruginosa DK2 chromosome</i>	15%	81%
		NC_014307.1	<i>R.solanacearumCFBP2957 chromosome</i>	10%	86%
		NC_016812.1	<i>Sinorhizobium fredii HHI103</i>	8%	87%
		NC_015666.1	<i>H.xanaduensis SH-6 chromosome</i>	3%	100%
0826		1	No major redundancy was found.		
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			

(Contd...)

0827	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			
0828	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			
0829	1	NC_017355.1	<i>H.pylori v225d chromosome</i>	99%	81%
		NC_017735.1	<i>H.cetorum MIT 99-5656 chromosome</i>	98%	80%
		NC_005956.1	<i>B.henselae str. Houston-1 chromosome</i>	31%	76%
		NC_018642.1	<i>Listeria monocytogenes L312</i>	13%	76%
		NC_010334.1	<i>S.halifaxensis HAW-EB4 chromosome</i>	3%	89%
	2	NC_002927.3	<i>B.bronchiseptica RB50 chromosome</i>	40%	77%
		NC_002928.3	<i>B.parapertussis 12822 chromosome</i>	40%	77%
		NC_015711.1	<i>M.fulvus HW-1 chromosome</i>	31%	79%
		NC_016803.1	<i>D.desulfuricans ND132 chromosome</i>	90%	71%
		NC_007517.1	<i>G.metallireducens GS-15 chromosome</i>	21%	82%
		NC_013715.1	<i>Rothia mucilaginosa DY-18 chromosome</i>	6%	85%
		NC_015311.1	<i>Prevotella denticola F0289 chromosome</i>	5%	90%
	3	No major redundancy was found.			
	4	No major redundancy was found.			
5	No major redundancy was found.				
6	No major redundancy was found.				
0830	1	NC_018938.1	<i>H.pylori Rif2 chromosome</i>	100%	78%
		NC_018939.1	<i>H.pylori 26695 chromosome</i>	100%	78%
		NC_018937.1	<i>H.pylori Rif1 chromosome</i>	100%	78%
		NC_017733.1	<i>H.pylori HUP-B14 chromosome</i>	99%	77%
		NZ_CM001538.1	<i>L.pentosus KCA1 chromosome</i>	3%	94%
		NC_012416.1	<i>Wolbachia sp. wRi</i>	2%	100%
	2	NC_016803.1	<i>D.desulfuricans ND132 chromosome</i>	26%	77%
		NC_017310.1	<i>Desulfovibrio vulgaris RCH1 chromosome</i>	22%	78%
		NC_014910.1	<i>A.denitrificans BC chromosome</i>	15%	79%
		NC_018829.1	<i>B.bronchiseptica MO149</i>	7%	84%
		NC_008740.1	<i>M.aquaeolei VT8 chromosome</i>	3%	90%
	3	NC_013922.1	<i>N.magadii ATCC 43099 chromosome</i>	2%	100%
		NC_009617.1	<i>C.beijerinckii NCIMB 8052 chromosome</i>	20%	78%
		NZ_CM000440.1	<i>F.nucleatum subsp. polymorphum ATCC 10953 chromosome</i>	8%	80%
	4	NC_003106.2	<i>S.tokodaii str. 7 chromosome</i>	2%	97%
		NZ_JH635997.1	<i>Pseudomonas sp. R81 genomic scaffold scaffold00001</i>	6%	80%
		NC_012660.1	<i>P.fluorescens SBW25 chromosome</i>	4%	85%
		NZ_CM001514.1	<i>P.synxantha BG33R chromosome</i>	2%	100%

(Contd...)

0831	5	NC_017737.1	<i>H.cetorum</i> MIT 00-7128 chromosome	98%	78%
		NC_014365.1	<i>Desulfarculus baarsii</i> DSM 2075 chromosome	10%	79%
	6	NC_018289.1	<i>Mycobacterium smegmatis</i> str. MC2 155 chromosome	18%	74%
		NC_008025.1	<i>Deinococcus geothermalis</i> DSM 11300	6%	86%
		NC_018581.1	<i>Gordonia</i> sp. KTR9 chromosome	2%	95%
	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
0832	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			
0833	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	NW_003573429.1	<i>L.africana</i> unplaced genomic scaffold	3%	100%
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			
0834	1	NC_014166.1	<i>Arcobacter nitrofigilis</i> DSM 7299 chromosome	2%	92%
	2	NC_019563.1	<i>H.pylori</i> Aklavik86 chromosome	97%	74%
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	NC_008536.1	<i>C.Solibacter usitatus</i> Ellin6076 chromosome	2%	100%
0835	1	NC_017735.1	<i>H.cetorum</i> MIT 99-5656 chromosome	51%	84%
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	NC_017735.1	<i>H.cetorum</i> MIT 99-5656 chromosome	97%	79%
	6	No Significant Similarity found			
0836	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No Significant Similarity found			
0837	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			

(Contd...)

0838	1	NC_008229.1	<i>Helicobacter acnonychis str. sheeba chromosome</i>	89%	81%
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	NC_007305.5	<i>Bos taurus breed Hereford chromosome 7</i>	4%	100%
		AC_000164.1	<i>Bos taurus breed Hereford chromosome 7</i>	4%	100%
0839	1	NC_018938.1	<i>Helicobacter pylori Rif2 chromosome</i>	100%	77%
		NC_018939.1	<i>Helicobacter pylori 26695 chromosome</i>	100%	77%
		NC_018937.1	<i>Helicobacter pylori Rif1 chromosome</i>	100%	77%
		NC_000915.1	<i>Helicobacter pylori 26695 chromosome</i>	100%	77%
		NC_014555.1	<i>Helicobacter pylori PeCan4 chromosome</i>	100%	77%
		NW_003816632.1	<i>Sarcophilus harrisii chromosome 1 unlocalized genomic scaffold</i>	100%	100%
	2	No major redundancy was found.			
3	No major redundancy was found.				
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			
0840	1	NC_014836.1	<i>Desulfurispirillum indicum S5 chromosome</i>	68%	73%
		NZ_JH815591.1	<i>Aeromonas hydrophila SSU genomic scaffold supercont1.1</i>	85%	72%
		NC_008576.1	<i>Magnetococcus marinus MC-1 chromosome</i>	55%	72%
		NC_018268.1	<i>Marinobacter sp. BSs20148 chromosome</i>	3%	100%
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
0841	1	NC_018938.1	<i>Helicobacter pylori Rif2 chromosome</i>	99%	79%
		NC_18939.1	<i>Helicobacter pylori2 26695 chromosome</i>	99%	79%
		NC_014560.1	<i>Helicobacter pylori SJM 180 chromosome</i>	99%	76%
		NC_000921S.1	<i>Helicobacter pylori J99 chromosome</i>	99%	76%
	2	No Significant Similarity found			
	3	NT_167613.1	<i>Oreochromis niloticus unplaced genomic scaffold ,orenil1.0 scaff</i>	2%	100%
	4	No major redundancy was found.			
5	No major redundancy was found.				
0842	1	NC_011498.1	<i>Helicobacter pylori P12 chromosome</i>	92%	79%
		NC_017733.1	<i>Helicobacter pylori HUP-B14 chromosome</i>	92%	78%
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	NW_003852396.1	<i>Otolemur garnettii unplaced genomic scaffold, OtoGar3 scaffold00001</i>	3%	100%
	6	No Significant Similarity found			

(Contd...)

0843	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	No major redundancy was found.			
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			
0844	1	NZ_DS981518.1	<i>Clostridium sporogenes</i> ATCC 15579 Scfld_02_1 genomic scaffold	4%	92%
	2	NC_014216.1	<i>Desulfurivibrio alkaliphilus</i> AHT2 chromosome	15%	83%
		NZ_JH719384.1	<i>Rhizobium leguminosarum</i> bv. <i>viciae</i> WSM1455 genomic scaffold R	3%	100%
		NC_008384.1	<i>Rhizobium leguminosarum</i> bv. <i>viciae</i> 3841 plasmid pR	3%	100%
	3	NC_011898.1	<i>Clostridium cellulolyticum</i> H10 chromosome	5%	93%
	4	NC_013169.1	<i>Kytococcus sedentarius</i> DSM 20547 chromosome	4%	93%
	5	NZ_DS981518.1	<i>Clostridium sporogenes</i> ATCC 15579 Scfld_02_1 genomic scaffold	3%	100%
		NC_000074.6	<i>Mus musculus</i> strain C57BL/6J chromosome 8, GRCm38.p1 C57BL	3%	100%
		AC_000023.1	<i>Mus musculus</i> strain mixed chromosome 1, alternate assembly Mm Celera	3%	100%
	6	NC_009483.1	<i>Geobacter uraniireducens</i> Rf4 chromosome	4%	100%
		NZ_JH719384.1	<i>Rhizobium leguminosarum</i> bv. <i>viciae</i> WSM1455 genomic scaffold Rleg5scaffold_2	3%	100%
		NW_001956553.1	<i>Drosophila erecta</i> strain TSC#14021-0224.01 scaffold_4820	3%	100%
0845	1	No major redundancy was found.			
	2	No major redundancy was found.			
	3	NC_009617.1	<i>Clostridium beijerinckii</i> NCIMB 8052 chromosome	20%	75%
	4	No major redundancy was found.			
	5	No major redundancy was found.			
	6	No major redundancy was found.			
0846	1	NC_017355.1	<i>Helicobacter pylori</i> v225d chromosome	98%	78%
		NZ_DS981517.1	<i>Clostridium sporogenes</i> ATCC 15579 Scfld_02_0 genomic scaffold	1%	94%
	2	NC_018142.1	<i>Propionibacterium propionicum</i> F0230a chromosome	34%	72%
		NC_008043.1	<i>Ruegeria</i> sp. TM1040 mega plasmid	1%	100%
	3	NC_017359.1	<i>Helicobacter pylori</i> Sat464 chromosome	98%	76%
		NC_016012.1	<i>Candidatus Arthromitus</i> sp. SFB-rat-Yit	16%	74%
	4	NZ_GL397087.1	<i>Selenomonas</i> sp. oral taxon 149 str. 67H29BP genomic scaffold	21%	75%
		NZ_DS999054.1	<i>Ruegeria</i> sp. R11 scf_1106758222068 genomic scaffold	1%	94%
	5	NC_017243.1	<i>Brachyspira intermedia</i> PWS/A chromosome	25%	73%
		NC_018607.1	<i>Brachyspira pilosicoli</i> B2904 chromosome	15%	73%
	6	NC_014815.1	<i>Micromonospora</i> sp. L5 chromosome	13%	78%
		NC_010645.1	<i>Bordetella avium</i> 197N chromosome	5%	81%

(Contd...)

0847	1	No major redundancy was found.
	2	No major redundancy was found.
	3	No major redundancy was found.
	4	No major redundancy was found.
	5	No major redundancy was found.
	6	No major redundancy was found.

5. DISCUSSION

This portion of the *Helicobacter pylori* gene, which begins at position HP0821 and continues until it reaches HP0847, is the part of the gene that causes cancer, and it is the proof that supports our assertion. The first thing we did was examine them using a technique called protein blast, and we discovered that they are highly comparable to *Helicobacter pylori*. Next, we revisited the nucleotide blast analysis after making a few tweaks to the bacterial nucleotide sequences. In conclusion, we were successful in locating a great deal of similarity between the genome of our bacterium and those of other bacterial species' genomes.

Codon number HP0821 For the first change in the nucleotide sequence, there is a maximum similarity of one hundred percent with the *Helicobacter pylori* India7 chromosome, a maximum similarity of ninety-nine point nine percent with the *Helicobacter pylori* Rif2 chromosome, and a minimum similarity of three point nine percent with the *Helicobacter cinaedi* PAGU611 chromosome. When we looked at the second change, we did not uncover any relationships that were powerful enough to be classified as statistically significant. When it comes to the third alteration, our unlocalized genomic scaffold is just 2% similar to the one that was found on chromosome6 in the species *Sarcophilus harrisi*. When we evaluated the fourth iteration, we found that none of the comparisons were even remotely applicable to the new iteration. We find that the chromosome of *Helicobacter pylori* SouthAfrica7 is 98% identical to our own. This is the closest match we have found. This is the conclusion we get when we compare them side by side. We observed that the sequencing of our organism is at least 95% identical to the chromosome of *Campylobacter jejuni* subsp. *jejuni* 1336 when we compared the two. The sixth transition seems to be separate from the others, as there are no evident parallels that can be drawn between them at this time.

When we make the very first change to the nucleotide sequence of gene no. HP0822, we obtain a maximum similarity of 100% with the chromosome of *Helicobacter pylori* from South Africa 7, and we obtain a minimum similarity of 2% with the chromosome of *Anolis carolinensis* 5. Compare and contrast these findings with those that we obtained from analyzing the similarities

and differences between the chromosomes of the South American *Anolis carolinensis* 5 and the *Helicobacter pylori*. The fact that these results contradict those obtained from comparing the chromosomes of South Carolina's *Anolis carolinensis* 5 and *Helicobacter pylori* suggests that the two bacteria are not connected to one another in a very close way. The second, third, and fourth potential permutations of the nucleotide sequence all share nothing of note in common, as far as we can tell from our investigation. We found a maximum similarity of 99% with the nucleotide sequence of *Helicobacter pylori* F57, and we found a minimum similarity of 98% with the sequence of *Helicobacter pylori* G27. These findings are reviewed in light of the information that is now available regarding *Helicobacter pylori* and its G27 chromosome. After making six different adjustments to the nucleotide sequence, we discovered that our new sequence is just 3% identical to the one that was reported for *Modestobacter marinus*. There are no discernible parallels between any of the first, second, third, fourth, fifth, or sixth iterations of the nucleotide sequence that makes up gene no. HP0823. It makes no difference whether the iterations are numbered 1-6; this is always the case. The point in time that corresponds to the very first alteration in the nucleotide sequence is where we observe the highest level of similarity between HP0824 and *Arcobacter* sp.L. The findings from analyzing the various nucleotide sequences provide us access to the same broad categories of information.

6. CONCLUSION

We were able to acquire the data necessary to construct an algorithm that would infer the nucleotide sequence from the protein sequences after merging the data on the protein sequences of 27 different genes. The data that we gathered served as the basis for the creation of this algorithm. This stage was performed once the information on the sequences of proteins made by 27 unique genes had been compiled and organized. We used a process called a blast on the nucleotide sequences in order to find the gene that had been altered and revert it to its original form. An extensive amount of research led to the discovery that an *H. pylori* species was the primary contributor of these 27 genes in their original form. It was discovered that this is indeed the situation. In the not too distant future, we plan to carry out our additional

research with the intention of precisely pinpointing the source of those genes, and this endeavor will not be too far off in the distance.

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