Conceptual Framework for Introducing e-Governance in Iraqi Higher Education Institutions

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Abstract:

   With emergence of technology and growing demand of the society, e-Governance became a key issue and developed nations started adopting it to better serve their organizations through efficient and effective services, with accountability and transparency. e-governance can be defined as a set of activities involving the effective contribution of information and communication technology (ICT) for strengthening administration and management e-governance is the use of Information and Communication Technologies (ICT) for the planning, implementation, and monitoring of higher education programs, projects, and activities. The higher education sector has remarkable growth in the administration of institutions intricate. Many paperes reveal that the integration of ICT helps to reduce the intricacy and enhance the overall administration of higher education. e-Governance is expected to help deliver cost-effective and easy-to-access user services, and improve processing of transactions. . The Iraqi higher education system has declined somewhat over the past three decades due to remarkable increase in the number of colleges and universities and their privatization. It has become very important for the government to keep track of their functioning. Educational institutions may have various requirements that include computerization and management of processes such as registration, admission, student information, classes, time table, transport, attendance, library, salary and expenses, examinations, performance, grades, hostels, security and reports. In this paper, an attempt have been made to discuss the concept of e-governance and use of latest application in higher education sector. This study also propose a roadmap to the implementation of an e-governance framework for monitoring, regulating and better administration in Iraqi higher education system.

Keywords: key words, e Governance, corporate governance, ICT ,IT, Quality Management.

1. Introduction:

   With the emergence of modern technology, the World has recognized Information Technology as an effective tool in catalyzing the economic activity in efficient governance and in developing human resource. However, the concept of governance has made a significant change of improving information and service delivery, encouraging peoples' participation in the decision-making process and making the organization more accountable, transparent and effective,. The e-Governance has consequently become became a key issue and an accepted methodology involving the use of Information Technology in improving transparency, providing information speedily to all citizens, improving administration efficiency and improving public services such as transportation, power, health, water, security and municipal

services e-Governance can be defined as a set of activities involving the effective contribution of information and communication technology (ICT) for strengthening administration and management. In higher education E-governance is the use of Information and Communication Technologies (ICT) for the planning, implementation, and monitoring of higher education programs, projects, and activities (Lavanya, 2015).

The higher education sector has remarkable growth in the administration of institutions intricate. Many papers reveal that the integration of ICT helps to reduce the intricacy and enhance the overall administration of higher education e-Governance is expected to help deliver cost-effective and easy-to-access user services, and improve processing of transactions. Despite a global adoption of the quality in higher education, it has not been developed within the Arab region, including Iraq, as a result of low level of organization' readiness for change, and the lack of basic knowledge of new technology in higher education, (Haffar 2010).

However, in countries like Iraq, higher education is challenged with various problems for instance, higher education system has declined somewhat over the past three decades due to a remarkable increase in the number of colleges and universities and their privatization, above that the situation in 2003 the Iraqi infrastructure has been suffering from huge damages as a result of the war. Nevertheless, to cope with new technology developments that impacted the, education, service and government sectors and their influence on various applications this increasingly being felt of late in Iraq, after 2003, the noticed improvement of Iraqi economy supported and encouraged the adopting new technology in the Iraqi universities, and made the ability of adopting it possible, but some challenges must be specified and must be treated (Awad,2014).

The globalization introduces of new concepts and applications backed by the rapid developments of communication systems and information technology, as results, the importance of higher education has increased in the light of what resulting essential shifts to adapt to the knowledge of society, and the challenges among international markets have moved to higher education institutions, and such challenge imposed any university seeking to global challenge to reconsider its strategies and systems and that would impact on their ability to gain access to global competition (Jerio, 2010).

Therefore, it has become very important for the government to keep track of their functioning. A clear strategy must be followed to make this process successful and transferred Iraqi higher education to better levels. Educational institutions may have various requirements that include computerization and management of processes such as registration, admission, student information, classes, timetable, transport, attendance, library, salary and expenses, examinations, performance, grades, hostels, security and reports. This study, made to discuss the concept of e-Governance and use of latest application in higher education sector. Also proposes a roadmap for the implementation of an e-Governance framework for monitoring, regulating and better administration in the Iraqi higher education system.

2. Definitions of e-Governance:

e-Governance has recently received heavy attention in its developments and implementation in the digital world where the expectation of the individual has comparatively increased. As the need to reduce the gaps between the expectation and perception of governments, offerings and its citizens have increased, thus in order to cope up the governments have to seek a better strategy for making decisions and clearer visions for the country's prospects (Mubasher, 2011).e-Governance refers to the use of ICTs to reach the aims related to governance. Governance can be explained in terms of its main components. These components are participating, transparency and accountability, information and service delivery,

communication, and interaction in governing processes (Pina et al., 2007; Sandoval-Almazan & Gil-Garcia, 2012). (Lean, Zailani, Ramayah, & Fernando, 2009; Yildiz, 2007). ICTs are tools to realize these aims and provide an end in itself to the government because, today, governments aim to meet the challenges of the emerging information society. It also means "preparing for greater and faster interactions with citizens and ensure better knowledge management" (OECD, 2001, p. 19). It is important to understand the meaning of the main components of governance to understand e-governance and young citizens' Internet usage in e-Governance applications. Moreover, the UNESCO definition (www.unesco.org) is: "e-governance is the public sector's use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective. e-Governance involves new styles of leadership, new ways of debating and deciding policy and investment, new ways of accessing education, new ways of listening to citizens and new ways of organizing and delivering information and services. e-Governance is generally considered as a wider concept than e-Government, since it can bring about a change in the way citizens relate to governments and to each other. e-Governance can bring forth new concepts of citizenship, both in terms of citizen needs and responsibilities. Its objective is to engage, enable and empower the citizen." In today's world, e-governance is looked upon as a strategic approach that supports and simplifies governance for all parties: governments, citizens and businesses (Basu, 2004).

2.1 Educational e- governance applications:

The effective use of IT services in educational administration can significantly enhance existing efficiencies, drive down communication costs, and increase transparency in the functioning of various departments. In educational area e- governance could be an important tool for the governing body of the institute. It provides the following benefits: Increased efficiency in various governing processes, transparency and absolute clarity in all aspects, and empowerment of the faculties and encouragement of their participation in governance. University governance refers to the structure and process of authoritative decision making across issues that are significant for external as well as internal stakeholders within a university. The structure of university governance may be visualized in different ways--as a series of concentric circles, for example, or as a set of overlapping circles. In any case, an extensive group of stakeholders, seeks to influence university rules and. These stakeholders include higher education associates, funding organizations (Dennis John 2003). According to Goddard et al. (2006), the universities have played a vital role in the economic and social development of the country and of the regions where they are located. The University is a relevant actor in the social system, in what concerns the development of human capital, through the supply of new professionals that have universalistic skills which provide a better identification of social and economic responsibilities. In this sense, the universities should be able to give answers which are suitable to its social and public responsibility, through the prosecution of four main objectives:

(i) Education and learning;

(ii) Commercialization of the paper;

(iii) Cooperation and partnerships with the industry; and

(iv) Cooperation with external institutions and centers.

If the quality of higher education system has to be improved to make these institutes really word class, then there is no alternative to the introduction of e-Governance in this sphere at the fastest possible pace. Implementation of e-Governance in technical and vocational institutes will enable their effective & real time monitoring

by government/the regulatory bodied & other stakeholders their own managements, parents of the students & the society, thereby forcing them to maintain quality and become more responsible. e-Governance process brings transparency in the system, so e-Governance initiatives in the field of higher education will help reduce the corruption up to a large extent. The introduction of e-governance in higher education is one such concept that can empower the governing bodies to administer the progress of the education plan in the whole country and serves various stakeholders in a much better ways. e-Governance is becoming a global phenomenon that is increasingly attracting the attention of community citizens including politicians, economists, decision and policy makers amongst others (Naheed et al., 2009). According Info Dev Report (2002) an effective e-governance satisfies these following needs:

1. Providing greater access to government information;

2. Promoting public engagement by enabling the public to interact with government officials;

3. Making government more accountable by making its operations more obvious and thus reducing the Opportunities for corruption; and

4. Providing development opportunities, especially benefiting rural and traditionally underserved communities.

e-Governance in higher education system will enable various stakeholders to control the improved operational efficiency in various key processes like grants, utilization certificates, approval processes, feedback mechanism etc. With deeper visibility and increased operational efficiency the Iraqi higher education system would be implemented not only to satisfy the needs of students by making them more employable but also combat possible competition from foreign universities. In order to remove the copying of procedures, there should be consolidated information about each university and college to track their performance. The tools of e-governance may enable the universities or colleges to submit the documents online for approval. All agencies should internally co-ordinate to carry the details from common pool. This would greatly reduce the unnecessary duplication of work in the university. Apart from this there may be a number of other services that can be provided with the introduction of such type of governance.

3. Methodology:

This paper used the survey strategies. Survey is a common and popular strategy in business and management paper. Surveys allow the collection of a large amount of data from sizeable population in a high economic way and mainly based on questionnaires, because it is easily understood and can easily come to a conclusion. In this paper, the questionnaire was distributed among employees working in higher education institutions in Iraq. In this study data sampling conducted from one of the biggest university in Iraq University of Technology Baghdad, which is located in Al-Sina'a Street in the area of Tel Muhammad in the center of the capital Baghdad. The target populations for this study were 150 employees at university technology Baghdad, who comprised of 30 professors and 120 student. The study targeted both management and post-graduate students so as to minimize subjectivity of the responses, by reconciling the responses from all levels of the university. A sample size of hundred (95) participants was used for the study. The respondents were therefore grouped into sections as defined by their positions in the university, which are; professors, management, post graduate students, and employees. The study used structured questionnaires to collect the data from respondents. A pilot study was done to a pilot sample of respondents randomly selected from the target population, in which 10 questionnaires were distributed to the pilot sample, so as to evaluate the appropriateness of the questionnaire towards achievement of the paper objectives. Data was

analyzed into percentages, means, and standard deviations (SD) using the Statistical Package for Social Sciences (SPSS 20.0).

4. Findings and Discussions:

This paper study has a very clear implication for the entire institution which are concerned with developing the strength within the organization and developing e governance. The study was purely descriptive nature where the major objective was to explain the various factors which are linked to the e governance. The paper study clearly lays emphasis that a strong leadership quality is what which can help the higher education institution to accomplish its goals. It is also suggested that in order to attain the cope with development country over the world the institution which can increase the e governance program needs to take certain measures.

The paper study about higher education institution in Iraq was worth its efforts. The values obtained from the paper study were very significant and reliable. Since Internet Technology has evolved rapidly in the last few years, there is a need to think strategically about where we want to be in the future. As time goes on, new technologies will continue to develop at a rapid pace and we must be flexible enough by showing quick response to the technology explosion. The state that is faster in adopting the technology have started reaping the benefits already. Process level changes are required before rushing to the web to launch the 'Government Online'. At the same time the government managers should quickly learn to use technology fueled management tools for administrative efficiency and use them for a more value added service to the citizens. To make the futuristic vision work, there is a need for collaboration among e-Governance virtual communities. This demand more political and organizational will take hard decisions, change themselves and learn to build capacities for e-Governance. 'Outdated' regulations and procedures are to be removed before launching the project. The above issues and challenges are not

beyond our capacity to resolve, but they need immediate attention. In order to obtain the basic information on each of these factors, the descriptive statistics were calculated and the results are discussed below.

1. People:

To test for validity of the model with a null hypothesis and a probability level of 10% which will show that the regression model is valid. The T test which is generally used to test the relationship between the independent and dependent variable. The Pearson correlation value of people is 0.989 which is very strong which is very good.

Table 1: People Correlations

		E governance	people
Pearson Correlation	e governance	1.000	.989
	people	.989	1.000
Sig. (1-tailed)	e governance		.000
	people	.000	
N	e governance	250	250
	people	250	250

The adjusted R square value is 0.978. This indicates that 98% of the variance can be predicted from the independent variable. For the independent variable the sig=0.000 which is a null hypothesis and is rejected and it shows that there is a strong relationship between e governance and people support in organization when it comes to employees which implies that e governance is depending on the people support.

Table 2: People Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.989ᵃ	.978	.978	.06056	.978	11124.299	1	248	.000

a. Predictors: (Constant), People Support

Table 3: People Support ANOVAᵃ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	40.798	1	40.798	11124.299	.000ᵇ
	Residual	.910	248	.004		
	Total	41.708	249			

a. Dependent Variable e Governance

b. Predictors: (Constant, People Support

The coefficients table is one of the most important tables in the analysis chapter. The coefficients table shows the standardized beta coefficients which are interpreted with the correlations results. The study in this table about the T value and the Sig opposite to independent variable so which implies that this variable will be contribute significantly or not to the paper process. Equation:

$Y = a + bx + e$ $Y = -.081 + 1.013$ people Support. The value derived from the coefficients table positive and signifies that the relationship between both the independent and the dependent variable is very strong.

Table 4: People Support Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	-.081	.047		-1.722	.086			
	People Support	1.013	.010	.989	105.472	.000	.989	.989	.989

a. Dependent Variable: e governance

2- Resource

To test for validity of the model with a null hypothesis and a probability level of 10% which will show that the regression model is valid. The T test which is generally used to test the relationship between the independent and dependent variable. The Pearson correlation value of Resource is 0.854 which is very strong.

Table 5: Resource Correlations

		E governance	Resource
Pearson Correlation	e governance	1.000	.854
	Resource	.854	1.000
Sig. (1-tailed)	e governance	.	.000
	Resource	.000	.
N	e governance	250	250
	Resource	250	250

From the Model summary table the value of the adjusted R square is 0.730. This indicates that 73% of the variance can be predicted from the independent variable. The independent variable the Sig. f Change is 0.000 which is a null hypothesis and is rejected and it shows that there is a strong relationship between E governance and Resource when it comes to E governance which implies that Role E governance is depending on the organization Resource.

Table 6 Resource Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.854ᵃ	.730	.729	.21323	.730	669.348	1	248	.000

a. Predictors: (Constant), Resource

Table 7: Resource ANOVAᵃ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.432	1	30.432	669.348	.000ᵇ
	Residual	11.276	248	.045		
	Total	41.708	249			

a. Dependent Variable: e- Governance

b. Predictors: (Constant), Resource

The coefficients table is one of the most important tables in the analysis chapter. The coefficients table shows the standardized beta coefficients which are interpreted with the correlations results. The study in this table about the T value and the Sig opposite to independent variable so which implies that this variable will be

contribute significantly or not to the paper process. Equation:

Y= a + bx + e Y= 1.550 + .690 Resource. The value derived from the coefficients table positive and signifies that the relationship between both the independent and the dependent variable is very strong.

Table 8: Resource Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.550	.128		12.133	.000
	Resource	.690	.027	.854	25.872	.000

a. Dependent Variable: e- Governance

3- Technology:

The third variable of the paper framework is the technology. In order to test the validity of the model with a null hypothesis and a probability level of 10% which will show that the regression model is valid. The T test which is generally used to test the relationship between the independent and dependent variable. From the Correlation Table the Pearson correlation value of the technology is 0.912 and its considered very strong.

Table 9: Technology Correlations

		E governance	Technology
Pearson Correlation	e Governance	1.000	.912
	Technology	.912	1.000
Sig. (1-tailed)	e Governance	.	.000
	Technology	.000	.
N	e Governance	250	250
	Technology	250	250

From the Model summary table the value of the adjusted R square is 0.831. This indicates that 83% of the variance can be predicted from the independent variable. The Sig. f Change is 0.000 which is a null hypothesis and is rejected and it shows that there is a strong relationship between e governance and technology when it comes to e governance which implies that e governance is depending on the technology in organization.

Table 10: Technology Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.912[a]	.831	.831	.16839	.831	1222.903	1	248	.000

a. Predictors: (Constant), Technology

Table 11: Technology ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.676	1	34.676	1222.903	.000[b]
	Residual	7.032	248	.028		
	Total	41.708	249			

a. Dependent Variable: e Governance

b. Predictors: (Constant), Technology

The coefficients table is one of the most important tables in the analysis chapter. The coefficients table shows the standardized beta coefficients which are interpreted with the correlations results. The study in this table about the T value and the Sig opposite to independent variable so which implies that this variable will be contribute significantly or not to the paper process. Equation:

Y= a + bx + e Y= .299 + .929 Technology. The value derived from the coefficients table positive and signifies that the relationship between both the

independent and the dependent variable is very strong.

The adjusted R square is 0.312. This indicates that only 31% of the variance can be predicted from the independent variable which is very low. The Sig. f Change is 0.000 which shows that there is a relationship between the dependent and in dependent variable but it's not significant relationship.

Table 14: Process Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.561ª	.314	.312	.33957	.314	113.708	1	248	.000

a. Predictors: (Constant), Process

Table 12: Technology Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.299	.130		2.294	.023
	Technology	.929	.027	.912	34.970	.000

a. Dependent Variable: E governance

4- Process

The T test which is generally used to test the relationship between the independent and dependent variable. The Pearson correlation value of process is 0.561 which is positive. Where the Pearson value is still positive (0-1) but it was the lowest compared with other independent variable.

Table 13: Process Correlations

		Employee_Behaviour	Trust_Management
Pearson Correlation	e Governance	1.000	.561
	Process	.561	1.000
Sig. (1-tailed)	e Governance		.000
	Process	.000	
N	e Governance	250	250
	Process	250	250

Table 15: Process ANOVAª

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.112	1	13.112	113.708	.000ᵇ
	Residual	28.597	248	.115		
	Total	41.708	249			

a. Dependent Variable: e Governance

b. Predictors: (Constant), Process

The coefficients table is one of the most important tables in the analysis chapter. The coefficients table shows the standardized beta coefficients which are interpreted with the correlations results. The study in this table about the T value and the Sig opposite to independent variable so which implies that this variable will be contribute significantly or not to the paper process. Equation:

Y= a + bx + e Y= 1.399 + .714 Process. The value derived from the coefficients table positive but the value of Y was high compared with the value of independent variable. This means that there is no impact from Process on the e governance.

Table 16: Process Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.399	.323		4.332	.000
	Process	.714	.067	.561	10.663	.000

The paper study clearly brings in the importance of maintaining e technology and motivation in a working environment. Organizations need to ensure that they build those important factors in the organization to improve its performance and get the extra level of commitment from their employees. Organization's which barely able to develop the e governance values in order to survive for a longer period in the market and can sustain any kind of pressure. Once the organization achieves this many issues like to connect with world standard, time lost, bureaucracy can be reduced within the organization. The mangers should be responsible in building a quality culture; their strong leadership qualities can help the organization achieve this. The concept of a 'e-governance may be defined as delivery of government services and information to the public using electronic means. Such means of delivering information are often referred to as Information Technology or 'IT' in short forms. Use of IT in government facilities is an efficient, speedy and transparent process for disseminating information to the public and other agencies, and for performing government administration activities.

The design and development of such complex solutions pose significant challenges. One such challenge is that in current development environments, the application developers have to work at a low level of abstraction. This means taking care of low-level issues such as intercross messaging, tools integration, and data modeling while defining the application logic. Similarly, solution reconfiguration and management requires the solution administrator to have a detailed understanding of the application logic, making the task time-consuming and error-prone. Handling these challenges effectively requires highly skilled and experienced Information Technology professionals, increasing development costs for effective e-governance solutions. Solution administrators typically lack these IT skills, rendering change management impossible. In solutions developed to date, each e-governance solutions, has customized existing products to address an individual government agency requirement. However, this might not always be the most economical way to develop a solution

In conclusion, it is hoped that the findings of this paper can be benefited, used, and contribute not only to academic but also to the public sectors, especially to the Ministry of higher education in Iraq. And the organizations belong to development and improvement division and to the practitioners as a whole in proposed the model and the framework of this study as a benchmark to serve as a guide, and reference resources to implement e governance initiatives, which in turn assists in the strategic decision making process in the assessment of organization . Additional paper is needed on this subject area because the organization keep on changing due to the external and internal forces, so improving the performance in such circumstances would be the key to success.

6. Recommendations:

As with all other paper, this paper will also not escape from having certain imitations and weaknesses. This study was based on numbers of the response of the higher education institution. As such, it raises two particular concerns. First, it focused on two kinds of organization, private and government sector, and findings in other geographical or cultural places may be significantly different. Secondly, its relevance to public, non-profit organizations needs to be studied empirically.

But rather than simply attempting to replicate these results, which in itself would be worthwhile, different methods could be utilized to capture the responses to the important questions about e governance application that posed by this study. Interviews or case study methodology could be used to obtain a richer understanding of the paper area. One obvious area for future paper would be to try to confirm the findings of this study using respondents from a much wider range of contexts. Future paper could utilize this study's approach and look at government employees outside of local government authorities and also an interesting paper direction can carry out at employees from industry, the service sector and not-profit organizations and from other cultures.

An interesting paper direction would be to undertake and incorporate the perception of e governance into the cost and time reduction conception. Universities should plan to cost reduction initiatives obtain the positive emotional commitment of their employees to support skills and to perceive the culture change that reduces time costs. A truly committed employee can reduce time and costs more and sustain the reductions longer than an employee under duress.

Cost and time -cutting can be motivated in a very positive way of tying the effort to a positive outcome for the organization and its people. Doing so needs strict structuring and execution of efforts that obtain employee commitment to necessary decisions and culture changes. Additionally, requires a credible motivating vision of what the organization can become. The employee may be able to mandate way to an immediately lower cost structure, but if motivate people in positive ways that produce emotional as well as rational commitment, will get more time and costs out sooner, and therefore the benefits are going to be additional lasting.

7.References:

Abdullah, Osama Q., and Ammar Ali Awad.(2014) "Impact of Total Quality Management on Managing and Reducing Total Cycle Time in Manufacturing Projects."

Basu, S., Fernald, J. and Kimball, M., 2004. *Are technology improvements contractionary?* (No. w10592). National Bureau of Economic Paper.

Denis, D. K., & McConnell, J. J. (2003). International corporate governance. *Journal of financial and quantitative analysis*, *38*(01), 1-36.

Haffar, Mohamed (2010), the Influence of Organizational Culture on Total Quality Management Implementation in Syrian Public Manufacturing Organizations, *Brunel University.*

Jerio, Dakhel Hassan (2010): the total quality management, Journal of the Academy of Iraq, press 57, Part One.

Lean, O. K., Zailani, S., Ramayah, T., & Fernando, Y. (2009). Factors influencing intention to use e-government services among citizens in Malaysia. International Journal of Information Management, 29, 458-475. doi: 10.1016/j.ijinfomgt.2009.03.012.

Pina, V., Torres, L., & Acerete, B. (2007). Are ICTs promoting government accountability? A comparative analysis of e-governance developments in 19 OECD countries. Critical Perspectives on Accounting, 18, 583-602. doi: 10.1016/j.cpa.2006.01.012.

Saha, S.K., Naheed, A., El Arifeen, S., Islam, M., Al-Emran, H., Amin, R., Fatima, K., Brooks, W.A., Breiman, R.F., Sack, D.A. and Luby, S.P., 2009. Surveillance for invasive Streptococcus pneumoniae disease among hospitalized children in Bangladesh: antimicrobial susceptibility and serotype distribution. *Clinical Infectious Diseases*, *48*(Supplement 2), pp.S75-S81.