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ROLE OF TECHNOLOGICAL REVOLUTION IN TRANSPORT AND COMMUNICATIONS DEVELOPMENT

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ABSTRACT

The arousal of technology has changed a lot of aspects in human life and has drastically changed its path through a revolution that changed the whole world. This revolution took place in various aspects while affecting significantly the global economy and from those fields that considerably affect the life of human beings in the previous and current centuries are Information and Communication Technology (ICT) and transportation. It is these two factors that play a major role in the economy of countries and dominate the lives of societies in the world. Thus, this paper studies the impact of the technology revolution on communication and transportation while demonstrating the significance of these two factors and their interrelation as well that resulted from this technology revolution. It tackles the Information and Communication Technology as a crucial outcome of the technological revolution and its effect in its turn on Transportation and the influence both aspects have on individuals. This paper tends to show the relation between the development that Technology caused and the performance of individual's life. It is quite interesting to study this relation in our life to see this relation that Technology has created in aspects like ICT and Transportation to examine how such a development improved the life of human beings.

1. INTRODUCTION

Many achievements and progress as stated by Poley (2018) has been achieved in the last two centuries until we reached our days to a very advanced technology especially in fields like Communication and transportation. Technological revolution had significant reflections in fields like Information and communication as well as transportation as one of the main components in human life. Accordingly, ICT is currently fundamental for all practical purposes in the entire transportation networks besides of its crucial impact on the global economy as well and the progress in different fields in the world including the crucial need for developed transportation. In certain web pages, social media as well as chats have been discovered on impacting on the transportation conduct as per 2011 publications by Lyons, Jain and Line, bringing the query as to the manner in which ICT influences the progress, form besides maintenance of the transport segment. ICT may accelerate the concernment in extra maintainable structures of transportation like walking, bicycling or otherwise the public transport.

They may be utilized as alternative transportation methods or in initiating development in transportation demands. Salomon in 1986 was in the lead in raising the question associating the development of telecommunication opportunities towards the increasing demands in transport. A 2003 study carried out by Kitamura and Senbil implied extraintricate connections, for instance ICTmight possess four possiblyantagonistic results: neutrality, modification, complementarity and substitution. Theclassifications refer to growth in number of trips, variations in temporal and spatial besides thepatterns of travelling. Whereas theICT implications in transport conductcarries onbeing a study focus as per 2007 study by Kim. There exists no inclusive understanding of the interconnections especially concerning the development in smartphone besides app accessibilityever since the year 2007.Thus, the goal of this paper is primarily seeking to ascertain, reviewing in addition to conceptualizing the use of ICT with pertinence for transportation conduct as affected by technological revolution and this is based on a study done by Abigail (2014). According totheir analysis, interconnections of ICT besides transportation conduct are talked over in terms of their significance for probablealterations in transport way selections besides transportation demands. Secondly, outcomes are conceptualized by the use of the 2005 study by Steg on the difference of symbolic, affective and instrumental transportation values. The paper claims that variations in thevalue dimensions bring about transportationconductvariations and henceforth the sustainability of the transportation structure.

2. EVOLUTION OF COMMUNICATION

In Communication, it is obvious that technology progress that has started in the 20th century and continued in the 21st century had a great effect on Communication in its various aspects. starting with the GSM technology which has been transferred to 2G allowing internet access and the introduction of mobile phones into the market to be widely spread by consumers all over the world. As per Stone's study in 2015, the remarkable progress at that period was considered a turning point in communication which enabled the users to communicate with each other apart from fixed lines and from anywhere in the world while enabling them as well to exchange text messages (SMS) and multimedia messages (MMS).In addition, this 2G technology has been further developed to 2.5 G where the internet usage over the phone has been introduced through GPRs and Edge technologies which allowed the user to access the internet over the phone for web browsing and slow downloading of applications and files

The increase in the bandwidth capacity and data transfer rates (Stone, 2015) paved the way widely for the outstanding transformation in the mobile handset technology as the introduction of smartphones took place in parallel to the evolution of 3G technology allowing a huge progress in the media technologies inside mobile phones with high resolution that differed a lot from 2G handsets and a huge capacity with bigger size than those of previous technologies.After few years, 4G technology has been introduced (LEE.B, 2019) allowing further development especially in media features and video streaming and calls services which can be considered a real revolution in Communications allowing calls with videos among users regardless of place and time and reaching now adays the 5G technology.This technology will allow very high speed with no latency at all and this paves the way for using it not only for talking over the phone and video streaming but also in other domains like Medical, educational, industrial and others. In addition the Internet of Things (IoT) technology allowing the transfer of data without the interference of human or computer will be optimized and distinguished via 5G due to its features that fit IoT in its core function and aim. The expectations from 5G are very high (LEE.B, 2019) and from them we can mention examples like the ability of users to charge the mobile phone via their heart beats, testing the glucose level know the exact time of child birth in seconds, handset ringtone will vary according to the user's mobile status, enable users to sense Tsunami or earthquake before it happens. Thus, hard work is being done to have the dream of this another important revolution in Mobile network technology come true to make wireless communication a simple button out of complex high quality advanced process.As for other aspects in Communication, there has been progress in other aspects mainly in media which facilitated the life of human beings and kept him up todate with everything occurring in the world.

2.1 EVOLUTION OF TRANSPORTATION

Technological revolution has its remarkable and obvious touch as well on the development of Transportation and all its system. Transportation has passed through several developing phases where it started with pure basic means depending on metals and simple available equipment to establish various types of transportation that would facilitate the movement of human being from one spot to another.According to Jean-Paul Rodrigue (2017), transportation has a significant role in the development and expansion of global economy where the need of moving from a place to another and the various types of people mobilization for the sake of making a living or has its obvious economical maneuver. Thus the importance of transportation development is crucial in for economy and this justifies the reason behind the continuous progress in the means of transportation and the innovation of new technologies that will help in developing an intelligent transportation system to collect and share information that can avoid collisions among cars, deal with traffic jams, and reduce environmental impacts.

David Pickeral, Transportation Industry Smarter Solutions Team Leader at IBM said that ITS provides a transport network that operates like the Internet, where everything is linked instead of having a bunch of independent systems at regional, national or even global level, and also paves the way to standard-based interaction that reduces costs and creates value for everyone involved in traffic managementThe means of transportation has evolved on various aspects starting with rails ways, automobile industry, aviation and naval. Technological revolution has shifted these means from a machine to move from a place to another to a complex advanced required tool for daily life cycle to function normally.Thus merging information technology within transportation systems has facilitated traffic and paved the way for drivers to calculate distances, plan their trips and path and choose the best roads they should take to avoid traffic. Internet connection within vehicles has turned them from simple cars to a place where work, entertainment and other activities can be done while on the way and this also has its reflection being a simple example on the positive influence on local and global economy.

The development in rails ways and having fast tracks and speedy trains has facilitated the movement from a city to another for work or any other reason an easy target without having time as an obstacle and this also will have its positive impact on productivity and economy.Also the traffic control systems with all new technology has equipped concerned authorities all over the world to tackle traffic jams and reduce the number of death toll resulting from accidents.Technology as well has paved the way to new modern motorcycles which targeted the young generations to move and reach targeted locations like Universities, colleges, work places in a short period of time away from waiting for so long in public transportation.

2.2 ICT AND ITS IMPACT ON TRANSPORTATION DEVELOPMENT

In several transportation fields, ICT is primarily for the view of transportation structures as needed, to a level besides with an intricacy which by faraway surpasses previous discussions as per 2017 study carried out by Georgeo. As a result, it renders it challenging in assessing quantitatively if innovations by ICT have had an impact on transportation demands. Outcomes signify, on the other hand, that ICT may sustain transport mode change which is justified from sustainability standpoints, through ensuring that public transport, cycling or walking becomes more appealing. Innovations by ICT correspondingly enhances growths which can be perceived as obstacles to maintainable transport future like making automotive cultures, or social connection sites more appealing interlinking movements with social status as well as personality development. Discoveries generate sufficient proof that ICT has noteworthy implications for transport conduct, impacting on both transportation mode selections in addition to transportation demands, and as a result the general sustainability of the transportation system. Internet platforms, social connections besides applications have significance for travel conduct for the reason that they alter the instrumental, intuitive and figurative standards of the transportation systems. The difference of instrumental, figurative and intuitive dimensions of quantifiable commodities was first offered in 1992 study carried out by Dittmar Helga then later examined in the setting of car usage as accordance to 2005 study carried out by Steg Linda. Steg noted that for several individuals, the car seemed to be a figurative, whereby individuals may express themselves by using their car as driving is adventuresome, exciting besides delightful. It suggests that the usefulness of car travel isn't only reliant on on its instrumental value, but then again similarly on figurative and intuitive aspects.

This may moreover be perceived in the broader setting of developing ICT apps, whereby instrumental value variations consist of transport endorsement, like the comfort of the usage of public transport established on travel data besides intermodal integration; a developing dependability besides selection of transportation services; shared transportation chances; or else price evaluation. Intuitive value change denotes to identifying creation besides emotional concepts of transport however health will be an instance connected to insights of getting to be in a better shape. A 2012 study Watson mentions that whichever socio-technical change is a change in usual procedures. On the other hand, the procedure is two-directional, as transitions in socio-technical structures similarly impact on usual procedures as per the 2011 study carried out by Line et al. A crucial matter is therefore correlated with the knowledge of the procedures which holds in check transportation value changes. The Gamification model generates one probable foray in discussing specifically the manner in which applications are fascinating. Gamification denotes to the usage of game components in non-game settings in enhancing consumer involvement besides studying impacts as per the 2004 study which was carried out by Sarsa, Koivisto and Hamari. Gamification possesses substantial significance for transport conduct, for the reason that it facilitates transportation values, for example with respect to health or transportation planning As instances of gamification in transportation settings, a 2013 study by Kuramoto et al describes a game modified in motivating consumers in standing in dense public transport in Japan, whereas a 2012 study by Stam talks over a portal game for trucking drivers building up fuel savings. The games have similarly been technologically advanced towards supporting eco-driving as per 2015 study carried out by Munoz-Organero and Magana.

On the other hand, a 2015 study conducted by Prihatmanto and Hindersah evaluates the model of a taxi booking structure encompassing game components. Similarly, a 2015 study carried out by Hindersah and Mulyana describes gamification components in a set of traffic information. The circumstances exemplify that gamification by now has a crucial role in transportation settings, typically operational on the foundation of inspirational affordances like comparative maps, ratings, achievement bags, points and scores. Results impact inspiration, mental outlook besides delight in something.In the yet to come days, ICT would have a progressively crucial role in transport conduct. Applications incorporate private and public transport selections over a wider range of transportation modes besides may encounter rising anticipations for additionally personalized, maintainable besides integrated transportation solutions. Applications providing standardization besides universal functionality would be extra appealing, as they don't need travelers relying on extensive range of local resolutions of ICT. With respect to distant work, videoconferencing resolutions have been anticipated in making the necessity for real meetings superfluous. Up until now, there exists finite proof that ICT has lessened business travel. A 2000 study conducted by Smit and Geels demonstrates that ICT rise the number of contacts, probably resulting to lesser, however further distance trips. There exists similarly proof that travelers frequently wish, instead of desire to travel in many occasions because of figurative besides intuitive value measurements as per 2010 study carried out by Nilsson and Gössling. ICT resolutions backing distant work may hence simply be anticipated of gaining relevance for maintainable mobility whereby they save on time and money for the establishment as per 2010 study carried out by Rasanen et al.

As a final point, IT innovations require to be perceived as favorable circumstances for transportation administration besides making of policies. Consumer made content besides locality hunt down offers massive quantities of information which may be assessed in understanding transportation flows timely saving on space besides with respect to reactions towards interventions, infrastructural usage in addition to health linked matters as per 2015 and 2016 studies carried out by Witox and Romanillos et al respectively. BikePrint is an illustration of such information gathering towards developing cycling: heat humps, route selections, delays, average speeds in addition to numbers are entirely crucial for preparation as well as designing of fascinating bicycle structures as per 2015 study carried out by van de Covering and Bussche. Information produced with respect to sanitation or else views of air and noise pollution, denseness, congestion besides congestion traffic accidents can similarly become gradually relevant for transportation administrators in addition to the technological developers directing on or else governing driving strategies in intelligent means of transportation.

2.3 CONNECTIONS AMID ICT AND TRANSPORTATION DEMANDS

Interconnections of innovations in ICT besides developments in transportation demands have been discussed for at least three decades as per 2018 study by Mitchel. The substructure of debates has on the other hand transformed essentially over time, as opportunities of ICT continually progressed, especially with smartphone buildup. A study by Mitchel et al. (2015) in addition to another study done by Stead and Banister (2004) show that they were the first to ultimately talk over the ICT complexity besides transportation interconnections, bearing in mind ICT demand answers in addition to temporal and spatial dissemination results. Particularly, this encompassed producing, working and living the latter comprised self-employment, distance working, distribution and retailing, customized services, manufacturing systems and logisticsAn advanced understanding of ICT, travel as well as social connections was offered in the study carried out by Miller and Carrasco (2006) who discovered that transportation demands is depended on social significance of the contacts in the connection in addition to physical distances towards social undertakings.

Confirmation of transportation demands development because of usage of mobile phones was later offered in the a study carried out by Wang (2017) who discovered that alterations in life situations are generated alterations because of the usage of mobile phones besides travel conduct. Notably, during the period of the researches, the researchers still concentrated on the significance of email, regular phones and mobile phones usage. This confirms that in few years ago, researches' studying ICT besides transport interconnections still had a kickoff in considering more imperfect technologies as well as opportunities for utilization.Road protection initiatives can as indicated by Jacob Thomas (2009), be divided into action relating to users, training and education, traffic regulation, reward, compliance and associated vehicle activities. The implementation of ICT activities would include aspects such as preparation and instruction, the regulation of traffic legislation, related initiatives for automobiles and related infrastructure actions. Road protection, as indicated by David Wallington et al (2014), is well established to rely on variables such as weather shifts, improved police and camera-based compliance, hot spot reconstruction programs. It is in this regard essential that the speed control provisions and the efficient monitoring of vehicle speed limits be implemented by ICT road aids at various locations. Young Sohn (1999) proposed that if implemented, a strict surveillance program would reduce different degrees of seriousness, such as fatalities, severe incidents, minor injuries and lost property.

It takes a comprehensive method to establish municipal strategies for coping with a range of injury seriousness forms and benchmarked details. The physical appearance of the compliance unit will be assured by a successful police warning, which can broaden the potential for data gathering and integration of MIS. Ross Oven Philip et al (2011, in German) show the ability to decrease the number of road incidents by different compliance measures, including protection initiatives. Driving intoxicated or drunken is a hazard, speeding up road collisions and can be efficiently regulated if the intoxicated driver is quickly caught and properly penalized. In order to simulate and evaluate the protection quality of current structures, William Young et al (2014) assess state-of-the-art usage of virtual models. When it comes to discovering that there is no measure linking the derivative setting, accidents or actions or accident in order to give all components of the road system a single measure of protection, it advises testing whether or which mixture works exactly. In order to enable data access and use to measure even individual interventions, Murray et al (2012) advocate the use of an expanded information management framework. Kerala Police (2013) has observed that increasing deaths from road crashes are triggered by the motor driver with inappropriate driving patterns and violent, over-speed and intoxicated driving. Certain critical roles play a part in breaching rules and infringements of law and bad road conditions. The study indicates that the potential of integrating ICT help at different stages in the reduction of road injuries in Kerala is immense.

3. METHOD

The research implemented the quantitative approach throughout distributing surveys over 100 respondents for data collection. Only 72 of the respondents replied to the questionnaires. However, the research will analyze the collected data using SPSS statistical tool. The regression analysis will be implemented to validate the hypotheses based on a margin error of 5%. Furthermore, the researcher used google forms to collect data, and it had been distributed using emails.

3.1 DESCRIPTIVE STATISTICS

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Technology improved your way of life compared to 30 years ago	72	2	4	2.14	.387
Technology improved your way of communication compared to 30 years ago	72	1	6	2.22	1.189
Technology improved your way of transportation compared to 30 years ago	72	1	6	2.11	1.069
Information and Communication Technology has a significant effect on today's individual transportation	72	1	6	2.11	1.056
Individual Communication has improved a lot compared to 30 years ago	72	1	7	2.89	1.327
I cannot imagine myself without carrying on my smartphone	72	1	6	2.33	1.075
Developed Communication has improved the way I look to my car	72	1	6	1.96	.941
I cannot drive a car without having a blue-tooth installed	72	1	4	2.33	.949
Ordering a taxi nowadays is much faster and easier due to developed Information and Communication and Technology	72	1	5	1.53	.804
Developed Information and Communication technology is turning driving a personal car an enjoyable experience	72	1	5	1.85	.899
Due to Smartphones and latest communication development, I can reach who ever I want while driving safely	72	1	6	2.33	1.075
Information and Communication Technology made my abroad trips much more easier than 30 years ago	72	1	6	1.96	.941
Valid N (listwise)	72				

After collecting the questionnaires and analyzing them using the SPSS, most of the respondents stated that “Technology improved your way of life compared to 30 years ago”agree since the mean showed an average of 2.14 which falls into the agree scale.Most of the respondents which answered the questionnaires agreed that “Technology improved your way of communication compared to 30 years ago” since it showed a mean of 2.22 which falls under the agree scaleMost of the respondents which answered the questionnaires agreed that “Technology improved your way of transportation compared to 30 years ago”since it showed a mean of 2.11 which falls under the agree scaleMost of the respondents which answered the questionnaires agreed that “Information and Communication Technology has a significant effect on today's individual transportation”since it showed a mean of 2.11Most of the respondents which answered the questionnaires agreed that “Individual Communication has improved a lot compared to 30 years ago” since it showed a mean of 2.89 which falls under the agree scale.

Most of the respondents agree that “I cannot imagine myself without carrying on my smartphone” since it showed a mean of 2.33 which falls under the agree scale. Most of the respondents strongly agree that “Developed Communication has improved the way I look to my car” which showed a mean of 1.96 falling under the strongly agree scale. Most of the respondents agree that “I cannot drive a car without having a blue-tooth installed” since it showed a mean of 2.33 which falls under the agree scale.Most of the respondents strongly agree that “Ordering a taxi nowadays is much faster and easier due to developed Information and Communication and Technology”showed a mean of 1.53 which falls under the strongly agree scale.Most of the respondents strongly agree that “Developed Information and Communication technology is turning driving a personal car an enjoyable experience” showed a mean of 1.85 which falls under the strongly agree scaleMost of the respondents agree that “Due to Smartphones and latest communication development, I can reach who ever I want while driving safely”showed a mean of 2.33 which falls under the agree scaleMost of the respondents strongly agree that “Information and Communication Technology made my abroad trips much easier than 30 years ago showed a mean of 1.96 which falls under the strongly agree scale.

3.2 REGRESSION ANALYSIS

Table 2: Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.985[a]	.989	.989	.00638

a. Predictors: (Constant), Technology, Awareness, Transportation Development

Table 3: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.003	.001		-2.415	.018
	Technology	.527	.165	.158	3.193	.038
	Transportation Development	.632	.080	.650	7.889	.021

a. Dependent Variable: Performance

Relating to above linear regression conducted using the SPSS quantitative method to examine the data gathered on the principle of a marginal deviation of 5%, the analysis showed that there is indeed a meaningful association between both the research parameters, as the confidence interval showed correlations below 5%. However, and based on the above table the research hypotheses are validated as follows:

There is a significant association between advanced technology and performance (0.038)
There is a significant association between transportation development and performance (0.021)
This means that the null hypotheses proposed are rejected, and the alternative hypotheses are accepted.
Therefore, the following regression equation can be elaborated:
Y = A + BX1 + BX2
Where Y = dependent variable, B = Betta, X1 = independent variable, A = constant
Performance = 0.018 + 0.038 Technology + 0.021 Transportation Development
This means that:
For every one unit increase in technology, performance will be affected by 3.8%
For every one unit increase in transportation development, the performance will be affected by 2.1%

4. CONCLUSION

The paper has analyzed transportation interconnections and ICT as affected by the technological revolution, with an attention on innovations which come being significant for transportation demands in many years that have gone by, comprising web pages, social connections besides smartphones applications. ICT currently covers an extensive range of fields, impacting transport conduct with complex besides every so often inconsistent results for the systems being sustainable.Eventually, this can be understood in terms of alterations in instrumental, intuitive, and figurative transportation value measurements. Severallatestinnovations by ICT have affirmative sustainable results, because they enhance the concerns in maintainable structures of movement. However, severalultimatevariationssustained by the innovations like competitive travel will seemingly operate in differing directions, affirming concerns whereby each technological innovation increased demands instead of reduce it as per 2004 study by Stead and Banister.

With respect to this, it's graduallyimportant in understanding the significance of ICT in transport conduct, particularly since several innovations seem to combine societal besides psychological obstructions towards changes in transportation systems: Where personalities besides lifestyles are in danger, opposition towards changes would develop. Given the significance of ICT for transportation demands, rural and urban transportationarrangement besides design, town structures, transportation flows, health and climatic changes, seems being appropriate to more thoroughlyobserve societal and psychological results of ICT innovations, besides in considering their significance for transportation administration and the arrangement of extra maintainable transportation systems. All of this progress has affected and will affect in the future the global economy in a positive manner and in a way that makes every country obliged to catch up with this progress to improve their economies.

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