

Influence of ICT in Road Transportation

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Abstract-

Purpose: Information and Communication Technology (ICT) in logistics performance on road transportation is expressed in terms of operation cost and turns rotund time. Though, numerous effects known from the utilization of ICT in the road transportation and importance of vehicle tracking for logistics industry is immeasurable. The most basic use of a GPS device is, of course, tracking vehicle locations an extremely useful device to companies that use a fleet of vehicles in their line of business. Tracking for logistics industry can also provide information necessary to fleet management for instance if the driver has done his distribution task, the time or estimated time of completion, the place, rapidity, etc. With GPS tracking for logistics industry, you are conscious of the actions of fleet at any given time. **Design/methodology/approach:** This analysis thus seeks to fill the gap of knowledge by examining the influence of ICT on logistics performance on road transport. Keeping in today's technology requirement, resources, the leading web-based ERP solution providers in India, offers a powerful and efficient ERP solution for logistic and warehouse management. **Practical Implication:** This research would be useful to understand the Logistics ERP software symbolizes an advanced manner of organizing, shipping and transport associated processes with comfort and convenience.

Findings: This paper scrutinizes the influence of ICT on logistics by conducting a survey of writings on academic logistics magazines, newsletters and articles. It finds an outline for analysing the effect of information technology on road transport in terms of e-commerce, logistics and suggests theoretical mechanisms of impact.

Keywords: *Information and Communication Technology (ICT), Logistics performance, Enterprise Resource Planning (ERP), Road transport, GPS tracking.*

1. Introduction

The quick growth of information and communication technology (ICT) has led to diminished investment and functioning prices [1] and ICT utilization are observed as a key tool to enhance the effectiveness and responsiveness of contemporary supply chain operations [2]. In the field of cargo transportation and logistics, there has been a proliferation of schemes and procedural substructures supporting numerous corporate actions [3]. In this context, ICT has the prospective to lessen prices[4], enhance client service [5]and thus augment general competitive benefit [6].

The significance and role of logistics in corporate over the prior few decades have undergone important vicissitudes.

Logistics has ascended to the level of some particular form in the conduct of corporate. With the expanding rivalry, individualization of markets, development and creation of novel, ever-expanding network of formation price, logistics lasts to develop and turn into a tactical resource that has by now necessitates some level of staff and an assortment of detailed learning. For the being of a market economy, transportation corporations should concentrate on receiving the single greatest operative economic outcomes in the supply chain. This might donate to numerous factors, namely shaped market of transportation services, rivalry amongst enterprises and numerous modes of transportation and others [7].

New technology in the supply chain can assistance enhance supply chain suppleness, power up operation, lessen sequence time, accomplish greater effectiveness and convey products to client on time if executed properly. Even though the basic scope, aims and goals of the transport community have not altered considerably, the contests of technology nowadays are more than forever beforehand. Inside a generation, PCs have changed the daily responsibilities of the labour force PC utilize has infiltrated nearly everywhere. Data management abilities have highly enriched resource administration. Though, escorting the constructive effects are the contests of executing, supporting and subsidy these technologies in the world of transport. Narrowing the gap amongst leading-edge technology and its utilization, in addition to recognizing the lost contacts for applying technology in transport will be the on-going challenge [8]. This evaluation points to prospective solutions for technological contests in such regions as

- Applying data schemes and technology in the transport field;
- Applying system-user interfaces (e.g., communicating visuals) in addition to information management and information sharing;
- By network technologies (Internet, intranets and extranets) in transport;
- Prioritizing investigation, growth and show programs to enhance toil currently under way;
- Heartening the utilization of communal data scheme, IT semantics and benchmarks in the transport field;
- Easing and monitoring technology transference as a "user advocate" among transport administrations, sellers and colleges; and
- Evaluating the influence of PC technologies on transport administrations, comprising advantages in efficiency.

1.1 The role of ICT in road hauling

In specific, the key advantages allied with the use of ICT utilization in road transportation may be précised as follows:

- better route planning and transportation scheduling
- improved tracking of automobiles and goods along the shipment procedure
- faster transport operations as a outcome of more efficient data gathering and analysis
- improved documentation of transactions
- higher levels of coordination and integration between different road hauliers and other supply chain participants.

1.2 Literature review

Information and communication technology (ICT) plays an important role in the backing of supply chains and international logistics. Recent developments in the field of ICT have additionally transfigured the habits data is communal and supply chains are structured [9]. In transport logistics the application of ICT is to facilitate actions for instance shipment, cargo tracking and warehousing notification forwarding, in backing of product movement in the supply chain [10]. Another significant typical of logistics operations establish in harbours is multi-modality or co-modality, which is about the well-organized utilization of dissimilar modes on their personal and in blend, resultant in a maintainable and optimum use of resources [11]. Multifaceted logistics preparations can outcome from the combination of dissimilar modes of transport like road, sea and air.

ICT deployed in the road network are further old-style method of put into effect an alteration in conduct, by put into effect sterner rapidity restrictions. These stringent rapidity restrictions can be practical always by particular signalization or through Variable Speed Limits (VSL) contingent on traffic, substructure and climate information. Studies on VSL state that these schemes balance traffic flow by decreasing numerous traffic characteristics, for instance normal rapidity, number of lane vicissitudes, rapidity difference or time headways and donated to evade mobbing[12].

The multi-modality and variety of logistics actions establish in ports and numerous kinds of technologies obtainable symbolize a formidable contest in terms of recognizing tendencies dictating the espousal of ICT. For instance, it is highlighted that initial globalization and internationalization of supply chains positioned important focus on Electronic Data Interchange (EDI) through schemes that comprise TradeGate, CargoWise EDI, TradeNet and TradeXchange to facilitate trade management (e.g. meting out of trade and customs assertions) and enabling seamless trade transactions with the critical involvement of customs services [13]. In recent year's transport logistics operations have witnessed the adoption of various technologies based on radio signals, for example radio frequency identification (RFID) tags are extensively utilized to track and trace different types of cargoes within the confinement of a port area. The RFID tag might be appended straightforwardly to the payload or

conveyed by the driver/machinist of a hauling automobile helping in the port premises. Technologies comprehensively utilized to link hauling automobiles comprise cellular webs and satellite schemes and in a slighter scale UMTS, Wi-Fi, WiMax and 4G/LTE. Nevertheless, important contests unmoving persevere in terms of dependability and connectivity, difficulties because of problems allied with restricted range, scalability and safety [14].

Advanced Traveler Information Systems (ATIS) such as variable message signs (VMS)[15] and further lately, real time mobile navigation applications (apps) such as Waze, assist travellers in their spatial decision making, e.g., route, mode of travel, destination choice[16]. These changes signal a move from an era in which travel information was experiential, obtained by trial and error, to an era of descriptive, and today prescriptive, travel information enabled via ICT mediums. This paper analyses the influence of ICT on road transport in terms of analysing the e-commerce, logistics and suggests theoretical mechanisms of impact on logistics by conducting a survey of writings on academic logistics magazines, newsletters and articles.

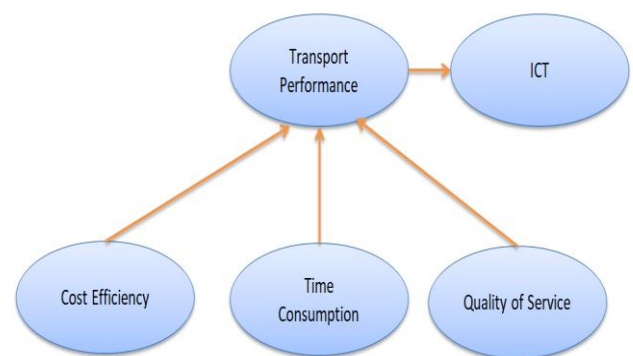
2. Objectives of the research

The objectives of the analysis are

- To comprehend the conception of ICT on logistics and road transport.
- To assess the challenges of ICT which road transport industries have to face.

The objectives of the analysis are to scrutinize the influence of ICT on road transportation sectors of Logistics.

3. Proposed conceptual framework



Source: Author's Model

4. Methodology

4.1 Data collection

Being an explanatory research it depends on secondary data of articles, journals, magazines and newspapers. In view of the objectives of study descriptive type research design is assumed to have more accurateness and thorough analysis of research study. The obtainable secondary data is tremendously utilized for research study.

4.2 An Overview of ICT in logistics with Road Transportation

In the logistics industry there are various ICT systems used. Each of these systems has some set of technical functionality that often overlaps with the other systems. These overlapping technical features not only depend primarily on the system type but also on the system software package implementation. Moreover, in order to fulfil its technical features an ICT system uses various information technologies. The ICT systems are as follows Transportation Management (TM), Supply Chain Execution (SCE), Field Force Automation (FFA), Feet and Freight Management (FFM) [17]; [18];[19], Warehouse Management System (WMS)[20], e-Logistics [21]. Figure 1 illustrates a conceptual model of these overlapping features.

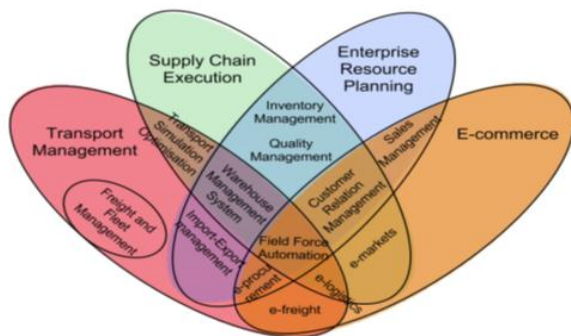


Figure 1. Logistics ICT systems functionality overlapping
The above Figure illustrates the overlapping technical features of the ICT system. From this it can be concluded that benefits of ICT systems can be generalized for all lower levels in the hierarchy, for example e-marketplaces and warehouse management systems. While benefits of lower hierarchy level ICT system may not be valid for all ICT systems in general.

ICT systems benefits: The advantages of ICT systems adoption from the literature are summarized in [20]. There are supportive roles for human activities, enhanced administrative (or own) productivity and effectiveness, help to perform actions quicker, backing independent executive processes, enable distributive operations, achieve higher logistics efficiency, adds transparency to the stakeholders, leads to espousal of improved corporate live out to encounter the client service levels, increases organizational capability to respond to a dynamic environment and reducing the cost of operation by as much as 50% over the traditional business practices.

ERP benefits as improved demand for visibility, inventory reduction, increase in profitability, reduction of cycle times, improved information availability, cost reduction, synchronisation between separate functions, flexible systems that are responsive to changing needs, customer oriented business models, superior concentration on interchange partner collaboration, reduction in the fences that enhance price or sequence time, responsive manufacturing methods, Internet-enabled communications and responsive warehousing methods.

4.3 Today's Transport Industry scenario in India

The subdivision comprises businesses giving transport of customers and freight, warehousing and storing for

properties, picturesque and touring transport and backing actions associated to way of transport. Founding in businesses utilizes transport equipment or transport associated amenities as fecund strength. Sort of equipment relies on way of transport. Way of conveyance is rail, water, road, pipeline and air. By altering fiscal scenario, factors for instance globalization of markets, global fiscal assimilation, evacuation of fences to corporate, trade and augmented rivalry have improved the necessity of transport. It is one of the greatest significant substructure necessities which is fundamental for enlargement of chances and exhibitions a significant part in creating or contravention the competitive situating.

Transportation capacities in India remain considerably not more than individuals in the technologically advanced nations. India has static to go extended manner in reinforcement its transport web. Nation's conveyance web suffers from numerous insufficiencies and in specific it has slight resilience to cope with unexpected demands. Conveyance, similar to altogether businesses is mainly swayed by ICT with the concentration existence on familiarity of client requirements and value additional facilities. Surface transportation is given by Road and Indian Railways mainly for conveying lesser worth greater part commodity, generally for administration subdivision. Freight Road Transportation is completely in pointers of secluded subdivision. India road conveyance is favoured for freight activity, where adaptability of steering adopts significance. It enables end-to-end distribution, defeating needless deferrals which generally happen in the other modes of conveyance.

4.4 Concept of ERP and how it helps in transport industry

4.4.1 The ERP (IT tools) utilized in logistics and supply chain management

Enterprise Resource Planning (ERP) - ERP is integrated software, encompassing all the business operations and bring about significant change in the way people work. ERP is a business solution that addresses to certain identified business issues. ERP is exceptionally costly and multifaceted workout which needs enough measure of planning. In India major ERP in use is SAP, Oracle which has been developed by foreign companies to suit the business environment prevailing in those countries. But, certain Indian corporations similar to Ramco Systems technologically advanced ERP to outfit Indian corporate surroundings.

The transport industry nowadays has to be progressing, continually, in further routes than one. It has to cope with the expanding demands of clients and providers, whereas at the same time frustrating to optimise the whole corporate operation at least price. To retain pace with altering corporate exemplars, haulers necessity further than forever to utilize IT, not only allows of operations yet as a tactical motorist and crucial corporate utensil.

Air Freight

Air Cargo corporations are fronting a bumpy ride. Aircraft petroleum costs have attained momentous highs, foremost to slowdown in air freight market development. A new-fangled air freight monitor necessity has been mandated.

Clients are fluctuating corporate to ground and sea transportation to diminish freight prices.

Airports and Ground Handling Companies

Examination in customers, exhibiting aeronautical data, tracking freight, Toning airplanes and entrances, are giving safety, supervisory air traffic and upholding airstrips. Airport machinists deal with an unbelievable measure of data to retain air traffic poignant effortlessly.

Consumer Travel

As of aeronautical scheduling to invigorate IT substructure, ERP can create universal of dissimilarity for airdromes, airlines and associated administrations. ERP aids sympathetic the customers' grave corporate problems.

Cruise Lines

Since giving data around your cruise line to creating misgivings to proposing aboard data facilities, IT schemes can aid give a greater client experience. You get strong keys that create a palpable influence on your corporate.

Express Distribution

Your clients are contingent on you to acquire their bundle there-on-time, every-time. You require data schemes that are fair as dependable. Furthermore, your data schemes should be adaptable sufficient to react altering corporate circumstances whereas residual profitable.

Freight & Logistics

ERP can aid you draw upon an international web of substructure, utilization and contract out facilities to carry your institute the keys you necessity to do well.

Hub, Terminal & Port Operations

You have a lot of data to cope with. Linking every bashes intricate in movement of possessions through a harbour needs the assimilation and harmonization of a huge quantity of data. ERP facilities are aimed make sure your IT schemes give you with adaptability you require, whereas guaranteeing your schemes are dependable, safe and profitable.

Third Party Logistics Providers

Since you are piece of manifold supply chains, your IT schemes should be capable of deal with an extensive assortment of data requires and setups.

Tour Operators

Collecting and supplying the vision trip needs you to incorporate data from an extensive assortment of bases. With 9,000 knowledgeable experts helping the transport business.

Travel Agencies

Your occupation is utilizing data to make a hassle-free portable know-how for your customers. With 9,000 knowledgeable experts helping the transport business, EDS is unequalled when it emanates to comprehension and addressing your grave corporate and technology problems. You get compact keys that create a palpable influence on your corporate.

Travel Distribution

Your achievement relies on your capacity to cope always altering data about the obtainability of airline chairs, guesthouse rooms and rental auto obtainability in addition to conversant valuing.

Truck Freight

Your occupation is retaining portable cargo. Your customers depend on you to acquire the burden there on time. So as to do your occupation, you necessity to address an extensive diversity of contests.

Vehicle Rental

Fleet administration, client misgivings, Back-office bookkeeping and Recruits. These schemes and further, need an important share in IT.

Warehousing & Contract Logistics

Warehouse administration schemes, mechanized material handling, bar coding, automatic information group, RFID schemes and Upkeep administration schemes. You cope with a lot of possessions to give warehousing facilities to your customers - however you too cope with a lot of data.

4.5 Challenges to Transport Industry

Forefall and encounter the quickly altering demands of international conveyance market - contests for instance purchasing/vending cost transparency, self-service channels, service commoditization and great delivery prices.

4.5.1 An industry under pressure

Across the orb, continued price stresses are coercing airlines to discover habits to remove above and change their exertions on mission grave actions. Airlines wrestling with elderly technology stages can donate to scheme outages, nearside deferrals and overall difficulties. Guesthouses and betting corporations are managing with amalgamation matters resultant as of unifications and purchases. Towards subsist, these corporations should deprive altogether however greatest tactically possessed goods and align marques to discriminated client know-hows.

For logistics and cargo corporations, having endways discernibility into supply chain is indispensable. For municipal transportation corporations, expanding request for seamless, multimodal, adaptable nearside portable is generating chances for assimilation and communal schemes.

4.6 ERP System in the Road and Transport Department

An ERP system is significant to the road and transportation branch of a local administration ought to make sure that they assume a data scheme plan that will address of all this issues underneath a unique software resolution. For the plan to be excessively operative, it ought not concentration on the daily actions of the road and transportation branch which will likewise augment the competitiveness and presentation of the road and transportation department.

The ERP can be utilized to easily access the sources of revenue and costs of road and transportation branch in

order to analyse any issues within associated with the finances. ERP will likewise be used by the organization to identify opportunities such as the need to construct a new road which will ease the traffic in one location. This can be attained through the road and transportation branch recognizing an earmarked zone that has been recognized inside the ERP which can proposal improved logistics of how the dissection can ensue with the construction.

The road and transportation branch will likewise utilize the ERP for such determinations as the assimilation of technological keys that will bolster its operations which will lessen prices and upsurge effectiveness. ERP will likewise be significant tool of hazard appraisal and estimate of interior controls and execution of the performance management methods.

These will enhance the operations of the road and transportation branch through the enclosure of presentation evaluation techniques that are aimed to aid the institute to enhance its operations. The ERP will likewise be useful to the road and transportation branch since through the assimilation of its operations in one ERP resolution will facilitate the reporting and conforming to guidelines which will enhance efficiency and reduce costs.

An ERP system is very beneficial to any organization such as the road and transportation branch of a local administration that has numerous benefits to derive if it implements an ERP solution.

ICT, the term normally includes information or communication devices and software and parts in the ICT industry. Rather than concentrating on one particular sort of data scheme/solution, Figure 2, the unit of scrutiny underneath investigation, shows the sort of ICT planning analysed in the seven port sites that partook in this investigation. The ICT prearrangement analysed includes numerous technologies for instance port site cellular/wireless communications, plate credit admittance schemes and keypads to control admittance to terminals and occupation scheduler applications utilized for arrangement the stacking and unpacking of containers and trucks. Job schedulers are frequently connected to mission critical company schemes for instance ERP. In Figure 2 hauling automobiles emanate to the terminal to load/unpack freight. Admittance to the terminal is granted through ICT-based schemes whereas in the port zone there is admittance to wireless indication (cellular or Wi-Fi). In the terminal likewise there is a dominant control room and job schedulers. Not all participating sites have the same degree of technological advances and sophistication in their ICT solutions shown in Figure 2, yet every one of them have in communal the utilization of ICT to allow interoperability and connectivity in ports connecting ample terminal operations and hauling automobiles (interior and exterior) at a time of expanding necessity for discernibility of track and trace abilities.

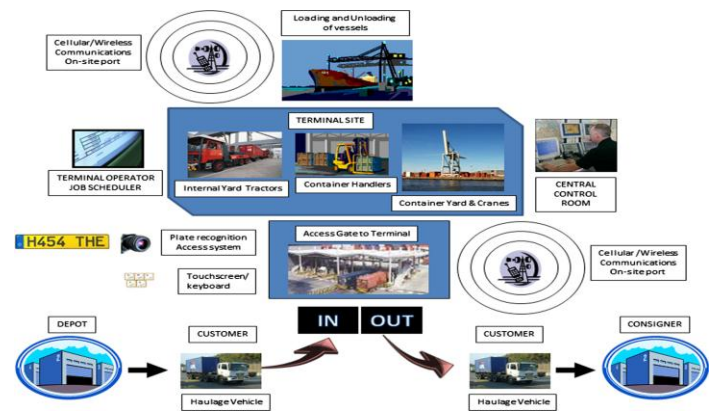


Figure 2. ICT solutions comprising the structure of seaport terminals investigated in this research work.

4.6.1 Navigation Systems

Geographic positioning systems (GPS) in conjunction with geographic information systems (GIS) proposal the likelihood of reducing the measure of time consumed on seek conduct by drivers. Assuming one embeds his/her source and terminus to the scheme, the shortest way will be offered. Such navigation systems are already common today, either portable or fixed (in-built in the car) and navigation satellite image is shown in figure 3. In an alternate mode, an expanding number of motorized automobiles will assume the way finding for you and minimize needless portable. The utilization of mobile communication in way advising appears undervalued for secluded auto utilize and deserves further consideration [22]. It is clearly for confidentiality causes; this sort of schemes isn't yet popular among secluded car motorists (see, e.g., [23

]). Schemes that optimize way choice have rarely the prime goal of decreasing the environmental effects of driving (lowermost aggregate petroleum ingesting) rather than the traditional aim of shortest time or distance.

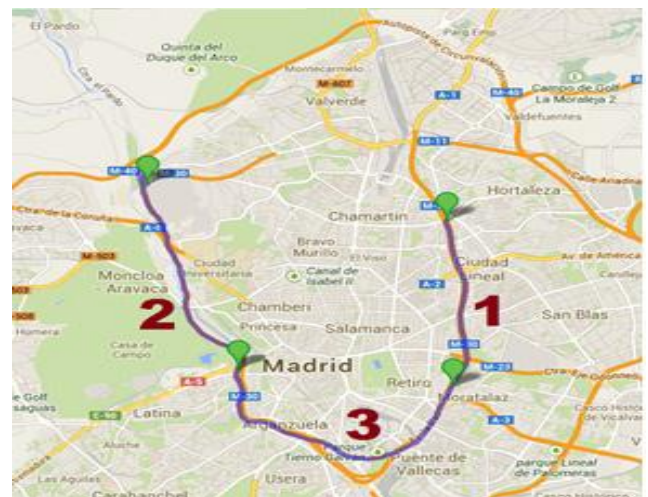


Figure 3. Navigation satellite image

Web Based Tracking –Logistics facility suppliers functioning in India are prolonging the facilities of web-based tracking of batches to their customers. Fed-Ex, Blue Dart, AFL and others are giving the status report of the batch to their customers. The clients can download this report by connecting through the Internet. This data aids in

scheduling the dispatch plan and furthermore making follow up with clients for payment collections.

5. Road Transport and applications of ICT

A main method to accomplish a maintainable transportation scheme is to diminish the measure of transportation spent. This is considerably at ease to state than it is to accomplish. Regulatory strategies could be formulated to accomplish this finale, or countries could hearten unpaid activities to achieve a similar finale. It goes without saying that the previous is extremely disliked and last is ineffective. Thus, numerous ICT novelties in the transportation scheme are inspected as probable habits of achieving the similar result. To this finale, initial a simplified layer model of the city transportation scheme is hosted that applies to people and cargo transportation, elucidates the dissimilar performers included and targeted aspects of the scheme (Table 1).

Table 1. A layer model of the city transportation system.

Layers	Actors involved	Target of ICT innovation
Layer 4. Persons and freight People (motorists), parcels, ampules, bulk, etc.	Private car customers Public transportation clients Cargo transportation clients	Drivers' behaviour: direction selection, driving rapidity, response in driving, lessening of driving tasks. Nearside conduct in public transportation: mode select and direction choosing. Rapid initial help after mishap. Cargo: routing and load same.
Layer 3. Vehicles moving through the system Cars, trains, vans, busses, vessels, bikes, etc.	Owners of secluded automobiles Logistics gives Chain organizers Automobile industrialists ICT industrialists Public transportation Corporations	Size of flow, rapidity of flow, ID of obstacles, amongst automobile length in flow (longitudinal, side), collision evading.
Layer 2. Services on the infrastructure Public transportation facilities (time schedules) facilities for upkeep and	Public transportation corporations Machinists of contacts and nodes ICT scheme industrialists Public experts	Providing/preventing (or decelerating down) admittance of public conveyance facilities to people Enhancement of same dissimilar facilities (seamless associates)

transportation administration		
Layer 1. Physical infrastructure (links, nodes) Road, rail, pipelines, waterways, airline etc.	Substructure suppliers Substructure proprietors Public experts	Providing/preventing admittance to substructure contacts and nodes to automobiles

The model comprises four layers, i.e., physical infrastructure, services to let the infrastructure work, automobiles poignant through the infrastructure system, people and cargo utilizing these vehicles. ICT novelties in the transportation scheme can likewise be characterized as said by the role of the data worried in drivers' behaviour. A distinction can be made between information that:

a. *Supports decisions* of auto motorists and passengers, e.g. on-road information on future mobbing, steering exhortation from a steering scheme to evade mobbing, driving instruction to optimize the utilization of auto petroleum, or the actual appearance time of public conveyance vehicles.

b. *Lessens choices or restriction motorists' conduct*, e.g. evading shares of networks, or restrictions to driving rapidity.

c. *Alerts motorists or passengers* without forcing conduct, e.g. numerous modes of advanced motorist help, similar to collision circumvention and lane keeping schemes.

d. *Helps to conquest motorists' verdicts*, completely or partially, similar in electronic bonding of autos and in intellectual rapidity adaptation and intelligent petroleum utilize adaptation.

The overhead roles frolicked by data demonstrate dissimilar degrees of constraints upon drivers' free choices. An exceptional instance are ICT novelties that buyout motorists' verdicts, since lawful problems regarding duty and accountability enter the scene and these static necessity to be settled, similar to duty and lawful accountability of motorists, ICT scheme industrialists and machinists of network schemes. These circumstances performances like a fence and be inclined to deferral the espousal of the novelties anxious.

6. Benefits of utilizing ERP for Transport Industry *Time and cost saving*

ERP schemes are most to aid your corporation modernize your procedures. It does not substance whether or not your corporation cope with broadsheet or plastics; ERP furnishes your corporation with correct scheme and presentation you require. ERP can assistance your corporation decrease functioning price and advantage once in succession corporation analytics. It enhances harmonization of your corporation's procedure into unique rationalized procedure where all can be log on through single initiative extensive data web.

ERP schemes can likewise advantage a corporation through easing daily administration actions. It heartens the founding of mainstay information warehouses and enables workers to admittance the data in actual time. This aids

with investigation, verdict creating and administrative control. It tracks real price of the day-to-day actions and can execute action based price utilities.

Tactical scheduling is additionally profited in ERP scheme is aimed backing resource arrangement in tactical scheduling procedure. This is usually feeblest share of procedure and multifaceted repetitive. However rumours and utilities of ERP afford can aid workers toil by tactical scheduling sittings and progress a complete unique that will help in corporation's procedures.

ERP software package are existence industrialized and rationalized continually. Certain software package even proposal mobile abilities consequently you can constantly have a finger on pulsation of your corporate actions as of your pda.

With actual time abilities and capacity to be capable of perceive what about with your corporation as occurs, ERP schemes are close once you cope with great capacity. With an ERP scheme, your corporation will not ever have register deficiencies or missed time consumed conveying documentations. You can exam ERP scheme beforehand purchasing and perceive how it will toil with your corporate.

- Decreasing IT expenses
- Cumulative on the web portable bundle sales
- Streamlining utilization portfolios to upsurge investments and effectiveness
- Utilizing mobile keys to generate investments by dispatching workers further productively
- Choice bearers, compute cargo prices, settle shipment prices and print official papers

ERP for Transportation can give answer for altogether your automobile operations, trucks, autos or some other business automobiles. ERP for Transportation business make sure we can give a single fleet administration ERP resolution for you. ERP for Conveyance will aid you inhibit expensive, unforeseen break-fix scenarios and stoppage because of ignored fleet automobiles and equipment. It helps as a prepared resource for fleet upkeep past, petroleum utilization and motorist particulars.

7. Discussion

The literature to date has been reviewed and the different ICT systems used the logistics industry have been categorized in order to determine the main drivers for adoption, the current barriers which exist and the availability on the market.

The research demonstrates that ICT systems facilitating road transport activities of the future are cloud based and cover a broad spectrum of technical features offered as open sources with possibilities to extend and adapt into a different level

[24]; [25] the study found that the most significant advantage of ICT systems adoption by road transport SMEs are cost reduction and improved competitiveness for small road transport businesses; cost reduction, errors reduction, improved competitiveness, business control and customer integration for medium size organisations and cost reduction, internal integration, business control, customer integration, improved competitiveness, improved quality and error reduction for large complex logistics providers. On the other hand the most common inhibitors for ICT adoption by road transport SMEs are the high cost, lack of

management initiative and support, lack of a common communication standard and lack of an ICT system that can fulfil the companies needs and perceived reason for adoption.

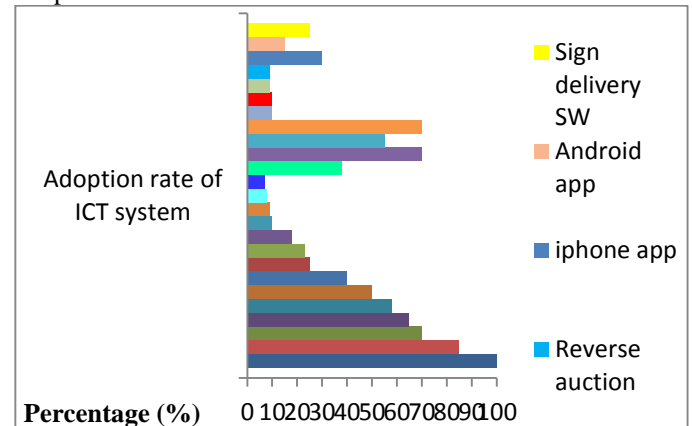


Figure 4 Adoption Rate of ICT System Features.

The study also compared the technical features providing benefits for road transport companies with the technical features current ICT systems are offering. The ICT system features found within the literature and the percentages of all of the features adopted at today's ICT systems on the market are illustrated in above Figure 4.

7.1 ERP aids in optimization of supply chain management and develops competitiveness by ensuring the subsequent advantages

- Speedier reply to client necessity.
- Reduction in inventory costs.
- Improvement in service levels- internal and external.
- Improvement in inventory turnover rate
- Reduction in logistics cost.

Instance - The corporations like Hindustan Lever, Colgate and Nestle have executed ERP in their supply chain scheme resultant in smallest inventory of raw material and completed goods and advantage in terms of cost decrease.

8. Conclusion

The contribution of research presented in this paper is to concentrate consideration on the significance of effectiveness enhancements through ICT espousal for transporters and importance of transporter espousal for the general schemes enhancement prospective. ICT is a promising tool that could tackle the challenges of improved customer service and efficiency that road transportation faces today. Previous fiction has concentrated on the aggregated level advantages that can be attained once a huge proportion of carriers have hosted ICT on the individual transport unit level. But, the issue of effectiveness advantages on the unit level in road transportation operations has been slightly analysed, which doesn't give a sturdy contention for driving investment and procedure alteration from the viewpoint of transporters' effectiveness. ERP systems aid cross-functional transaction automation and synchronisation resulting in compression of delivery speed and reduced order cycle times.

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