
Investigating the impact of Net Technologies on the effectiveness of SME's

-Analytical study-

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Abstract:

This paper aims to illustrate how the implementation of Network Technologies (Net-Techs) impact the effectiveness of small and medium enterprises in Algeria. It examines the way Net-Techs allow small and medium enterprises to enhance their productivity, reorganize human resources management and information systems, regulate competitive forces, lower expenses, effectively manage information and knowledge, enhance internal and external communication, facilitate decision-making, enter new markets, and boost their revenue. For small and medium-sized enterprises to effectively utilize network technology, several prerequisites must be fulfilled. The prime requirement is the integration of information technology and communications as a fundamental part of their overall strategy. Additionally, it is crucial to cultivate experts in information technology and communications, consistently enhance and modernize their applications, ensure accessibility for all members of the enterprise, and implement organizational adjustments and changes that align with the enterprise's new position.

Keywords: Net technologies, effectiveness, small and medium enterprises, information system.

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1. Introduction:

In recent years, there have been major and unprecedented advancements in various aspects of life. One notable development is the transition of the global economy from an industrial to a knowledge-based economy, where the utilization of modern techniques in knowledge management is crucial for enhancing performance. (Porter, 1985)

Consequently, network technology has become an essential tool for survival and success in an interconnected world, where competitiveness is a key factor for progress and prosperity (Schilling, 2017). Moreover, it serves as a driving force for economic growth in countries by improving the efficiency and effectiveness of businesses through the expansion of business applications and electronic activities. (Christensen, 1997).

1.1. Research problem:

In the era of globalization and the rapid changes and continuous advancements in the global economy, business in the 21st century are utilizing numerous technologies, with a particular emphasis on network technology:

Does the use of network technology in small and medium firms enhance their performance?

The prior question gives rise to the following sub-questions :

- In what manner are network technologies introduced to the organization and incorporated into different activities?
- Can the implementation of network technology alone effectively enhance and advance the enterprise's results?

1.2. Hypotheses:

- The use of network technology by small and medium enterprises enhances their performance in multiple aspects of marketing, business, and finance .
- The incorporation of ICT into the enterprise contributes to the enhancement of its information systems' layout and functionality, as well as the development of its internal and external communication processes .
- To optimize the utilization of information and network technology from a clear strategic perspective, these technologies should be gradually adopted, starting with initial testing, integration, and eventually transitioning to the use of ICT.

This should be associated by the dissemination of ICT at various levels, specialized training in network technology, continuous development and updating of ICT applications, and organizational adjustments and changes in accordance with the organization's new status .

2. Theoretical concept of network technology:

Prior to addressing network technology, it is essential to have a clear understanding of what a network entails. There exist several definitions of the concept of networks, which may be substantially similar, whether in the context of communications, information, or other domains .

The network is a complex web of interconnected interactions between business or organizations. A network is a structured arrangement of individual units that are coordinated and may overlap, with the goal of completing tasks more efficiently than any single unit could on its own .

Samuelson (Samuelson ,2018) provides a concise overview of the factors and components that networks require, as well as the factors that influence their quality. These factors are categorized into seven categories, all of which begin with the letter M :

- Mankind, with their concepts and capabilities :
- Machinery: any devices and techniques used for communication:
- Materials: including raw materials and any other necessary substances for the network :
- Monetary resources: designated funds and financial support:
- Messages: information to be transmitted through the network:
- Methods: procedures, expertise, and operational approaches :
- Measurement: Testing methods and evaluation of the network .

Network technology is the paramount and visible information technology and communications for the organization. The following technologies are examined, including their concept, qualities, and significance for the organization.

2.1. Internet

Internet can be defined as a global network of interconnected computers and devices that allows for the transmission and exchange of information. The following are the enumerated definitions of the Internet idea, with the most significant ones highlighted :

The Internet is a telecommunications network that enables the interchange of services through digital connections. It consists of a collection of geographically dispersed electronic devices that facilitate the efficient and cost-effective transmission of data between different locations .

The Internet is a complex system composed of numerous subsystems that operate within an open framework, enabling communication between a wide range of computers using the TCP/IP protocol. This protocol facilitates the rapid, adaptable, and decentralized exchange of information. Consequently, the Internet is a vast global network that connects millions of networks worldwide, disregarding geographical limitations. It

comprises computers located in various regions of the world, which interact with each other using a shared language, also known as the Internet .

2.1.1. Characteristics of the Internet:

The Internet possesses a distinct collection of characteristics that differentiate it from other networks :

The Internet operates on the IP Protocol, a publicly accessible protocol that is not owned by any specific company. The standards for this protocol are established and enforced by technical committees that oversee hardware vendors, software, users, and engineers, all of whom contribute to setting these standards. Furthermore, the Internet is open in the sense that any branch or local network can connect to it and become a part of it without any limitations or prerequisites .

The Internet is an interactive medium, distinct from mainstream media platforms like television, magazines, radio, and advertising. The Internet facilitates bilateral interactive contact among firms and customers, customers and other clients, and companies themselves. Internet users are active participants in communication processes, rather than passive recipients as in mass communication.

The Internet is vast and continuously expanding, with rapid development and widespread usage. Information on the Internet is scattered and requires the use of catalogues and search programs for easy navigation. The Internet serves as a significant platform for electronic commerce, allowing users to effectively market and promote their products. The Internet is constantly evolving due to ongoing research and innovation in information technology, particularly in networks .

2.1.2. Internet services :

The Internet offers numerous services, with the most crucial ones being :

- Emailing, file transfer protocol, global information network, telelink protocol, and discussion groups. Telecommunication service.
- Online retailing or electronic commerce sales platform: E-commerce is a highly significant internet application that facilitates online transactions, enabling the buying and selling of goods, services, and information. It functions as a digital marketplace where vendors, intermediaries, and buyers interact and exchange products and services in virtual or digital form, with electronic payment methods.(Christensen, 1997).

2.1.3 The use of Internet by businesses:

Currently, the Internet has turned into a digital marketplace that is experiencing a significant increase in usage by businesses. Many firms are utilizing the Internet for various purposes such as electronic communication, data transfer, marketing research, electronic information services, and the online selling of goods and services. The Internet is widely used for the purpose of globalization .(Porter, 1985).

The competitive advantage is achieved by declining costs and effective sales and marketing strategies, which are facilitated by electronic communications .

In the context of globalization, the Internet offers to business a crucial network of global connections that are essential for establishing a worldwide presence. The utilization of the Internet as a marketing technique offers firms the chance to provide numerous new and existing consumers with current information regarding items, services, technological advancements, and study.

Through utilizing the Internet, firms can gain enhanced access to a wide range of information, such as government databases, manufacturing statistics, and competing practices. The Internet also imposes expenditures and financial pressures on enterprises due to paper-based transactions. Furthermore, the utilization of the Internet facilitates customers in acquiring information regarding items, services, advertisements, pricing, delivery schedules, and after-sales support, among other things. The Internet provides businesses with access to a global electronic communications network that enables contact and engagement with customers, purchasers, and competitors .(Porter, 1985).

2.2. Intranet

It refers to a private network that is accessible only to authorized users within an organization .

2.2.1 Definition of Intranet :

An intranet is a private network within an organization or department that utilizes the same concepts and methods commonly employed in the Internet .

An Intranet is a localized information network within a specific organization that utilizes Internet protocols, specifically TCP/IP, to facilitate communication and access to information among individuals within the organization. This allows for faster, more efficient, and cost-effective communication and information retrieval .

To be more precise, the Intranet is a private information network that allows safe access and control of information, databases, and organizational resources using Internet technology .

The Intranet is often composed of many technologies regularly applied on the Internet, such as routers, internet scanners, internal servers, and search engines. Additionally, firewalls are employed to isolate the Intranet from other external networks .

The Intranet enables staff members to connect with each other within the enterprise using a local network. Its purpose is to facilitate communication and collaboration by allowing the division and exchange of information, particularly in cases where the enterprise's units and branches are located in different places .

The Intranet undergoes rapid and continual evolution in many forms within the organization. Typically, the Intranet exists in two distinct forms, each serving different purposes :

- Unrestricted Intranet Access: The members of the organization have the freedom to exchange information without any censorship or restrictions .
- Intranets designed for managerial or administrative purposes: This is a genuine method of implementing actions with the purpose of transmitting and spreading information in order to enhance the database.

The main purpose of the Intranet is to integrate and organize various Internet services and applications, enabling users to efficiently browse and utilize them. It has similar functionality to an Internet directory, typically consisting of an organized collection of services, search mechanisms, and the supply of new or global services .

3.2.2. Intranet promises for the enterprises :

The implementation of the intra-enterprise network enables :

- Independent access to information databases and free navigation: Development of private line services for the company's partners :
- Explore strategies and allocate resources to enhance staff productivity through initiatives such as structured training sessions, online lectures, digital publications, official announcements, and news updates .
- The development of upcoming web applications and information databases; The categorization and utilization of resources managed by the Business's main center and branches, particularly in prominent worldwide organizations :
- Provides distribution networks to facilitate sales and provide channels of communication between the business and its partners or agile personnel .

The Intranet also enables the firm to distribute and enhance the flow of information, as well as facilitate communication among its different participants .

2.3. Extranet :

The concept of extranets has arisen in response to criticisms of the Intranet system, specifically its lack of autonomy and limited interaction with external entities. Some argue that a successful network should foster ongoing connections and direct engagement with external stakeholders, a factor that the Internet has not adequately addressed .

The Extranet is a secure network that allows authorized external partners to access the Internet using passwords, specifically for inter-institutional economic cooperation programs. It is a result of the Internet and is designed to bypass firewalls, which protect against unauthorized access and restrict access to certain parts of the organization's information. These partners can include suppliers, distributors, or customers .

2.4. Groupware:

Due to its vague character, the concept of groupware is challenging to define as it encompasses the combination of techniques and behavior .

2.4.1 Definition of Groupware

The concept of Groupware was initially defined in 1978 by researchers at the American Technological Institute. Groupware refers to collective actions and efforts directed towards achieving specific goals and objectives, as well as the use of information tools and programs to support and facilitate such collective actions .

Groupware, is a software that enables a group of users to collaborate on a single project without the need for physical meetings. It encompasses a collection of methods, procedures, and information programs that allow people and employees to work together in a shared professional environment with optimal efficiency.

It involves the use of information and communication devices, programs, and leadership methods to facilitate the achievement of a common goal by a group of individuals, whether they are physically together or separated in time and space .

Groupware is a technological tool designed to facilitate collaboration and cooperation among members of an organization .

There are four scenarios in which the first groupware is used: when the project workers are in the same location, when they are in separate locations, when they are working together at the same time (Groupware), and when they are working at various times (Groupware)

2.4.2. Advantages of Groupware for businesses:

Groupware serves in many ways within the business, with the primary aim of fostering collaboration in specific projects. This, in turn, leads to a decrease in individual career advancement, while enhancing decision-making, coordination, cooperation, and communication .

Groupware is designed as a corporate infrastructure that enhances communication and information sharing, enables coordination and collaboration.

The Groupware system implemented by the business ensures a dynamic equilibrium in a highly sophisticated human setting that necessitates direction, leadership, and assessment.

Groupware enhances professional integration by bolstering coordination, interactions, and exchanges among various functions.

3.Reasons for the utilization of network technology by the organization

Operators are motivated to add network technology to their businesses due to many motivations, such as the facilitators and employers wanting to promote their work, products, and services to clients and partners.

- Disseminate comprehensive information regarding the firm, including details about products, services, and pricing, as requested by the customer.
- Delivering optimal services to the client with utmost efficiency and convenience:
- Attract a fresh cohort of online clientele;

- Ensure prompt and efficient distribution of information, since any delays may diminish its worth and pertinence;
- The Business's expansion into local, regional, and international markets aims to foster harmonious and constructive relationships between the enterprise's members and its diverse clientele.
- The motivation to decrease expenses, enhance productivity and efficiency, and innovate in the production of products and services; The drive to foster innovation, advance product and service offerings, and gain a competitive edge; The ability to respond effectively to rival actions.
- Streamlining administrative tasks and prioritizing core functions;
- Enhancing the internal staffing structure of the institution.

4. Implementation of network technologies inside the corporation:

Businesses leverage the benefits and opportunities provided by network technology for both internal and external purposes:

4.1. Internal utilization

The utilization of network technology, specifically enterprise network technology, for internal purposes allows for:

- Gathering comprehensive data on the business in a centralized repository that encompasses a clear description of the enterprise, its operations, hierarchical arrangement, goals, offered services and products, as well as its financial status.
- Creating a comprehensive employee manual that provides clear guidelines for identifying job opportunities, promotions, disciplinary actions, vacation entitlements, and awards.
- Establishing connectivity across all components of the institution, regardless of their location in several buildings or geographical dispersion.

The implementation of electronic working cards allows for efficient data processing, usage, and quick access to staff attendance records. Staff members are provided with standard documents that outline the procedures for screening and processing. These documents include job descriptions, tasks, and responsibilities.

To acquire data regarding rival products and their attributes in order to maintain a favorable competitive stance for the enterprise; Efficient and rapid dissemination of information across the organization;

Efficient and cost-effective transmission of papers by offering information on postage expenses and delivery time.

4.2. Use for external purposes

Organizations utilize network technology externally to benefit from the following advantages:

- The diffusion of promotional materials and marketing campaigns to effectively attract a wide consumer base for the products and services offered by the firm.
- Enabling customers to purchase groceries online using e-commerce.
- The rate of communication with those external to the institution via email;
- To furnish the organization with details regarding the materials and items it intends to get;
- To gain professional assistance through discussion groups at no cost;
- To have ongoing access to the job market for testing and selecting workers based on specific requirements;

To assess market demand for their products and gauge consumer satisfaction, thereby aiding in the development of future plans; The feasibility of choosing the suitable supplier based on their offers, which include factors such as delivery periods, product specifications, quality, and pricing.

To oversee the growth of the business industry and its rivals by ongoing contact and the clarification of their stances; To be aware of any market changes or transformations such as the arrival of a new competitor or the implementation of new regulations by the government.

5. The impact of Net techs on the effectiveness of SME's:

Net technologies have a remarkable impact on SME's effectiveness in various vectors:

5.1.Impact of network technologies on business efficiency:

Network technology has significantly transformed the production function by enhancing efficiency at every level of the production process. The computer has proven to be highly effective in carrying out the following tasks:

- Implement a computer-based design system that allows the product to create and showcase the desired item on a three-dimensional screen. This system will facilitate necessary modifications and enhance control over production costs.
- Computer-assisted production is available when the templates are finished and remains in effect until they are completed.
- Maintenance operation: The computer performs proactive diagnostics to detect disruptions before they happen.

Automatic manufacturing involves a thorough production program. Flexible workshops are computer-controlled workshops with minimal human involvement.

5.2.Impact of network technology on human resources management

Information technology has not only altered the techniques of production, but also impacted the human element within the organization.

- Utilization of network technology in the recruitment process:

Network technology facilitates the identification of competent personnel by utilizing the enterprise's information database. It is also employed during different phases of external recruitment and testing, where the simple act of posting a job advertisement online enables the receipt and processing of applications. This streamlined process results in savings of effort, time, and money.

- Implementation of network technology in information dissemination:

The labor force is the costliest element of manufacturing, encompassing both compensation and ongoing expenses related to building and kickbacks. The primary function of information technology is to facilitate education through methods such as computer-based distant learning, utilizing networks, and incorporating interactive lessons and electronic forums.

- Use of network technology to optimize worker performance:

Information technology facilitates the timely identification and rectification of problems, empowering workers to better their skills and intensify their oversight of subordinates in the workplace. It is important to consider the detrimental impact of network technology on employment.

- Utilizing network technology to establish innovative work practices:

The utilization of network technology has resulted in the development of novel job specializations such as teleworking, wherein a person operates from their residence, separate from the organization, equipped with essential instruments such as telephone, fax, computer, and networks. Telework has led to the emergence of mobile workers and represents a significant shift in labor dynamics.

5.3.Impact of network technologies on the regulation of the level of competition:

In order to flourish or simply survive, it is imperative for the firm to understand the level of competition it must confront. This can be achieved by analyzing the industry in which it operates and researching the five forces.

The influence wielded by buyers (clients); Influence exerted by suppliers; The influence of alternative products and services; The influence of new competitors; The influence of existing competitors;

We will analyze the impact of network technology on each of these factors and examine how it consistently works to undermine them, so enhancing the enterprise's position in its interactions with these forces:

5.3.1. Impact of network technology on customer:

Customers are becoming more influential and have the ability to negotiate better deals by buying larger quantities, engaging with many suppliers, and considering alternative products. However, the organization can limit this capacity by establishing a strong connection between the customer and its product. As an illustration, the Upjohn pharmaceutical industry has implemented and created systems for the submission of orders by drug warehouses and pharmacies in Europe and America.

These orders are promptly processed, resulting in reduced expenses for all parties involved in the exchange, including purchasing, storing, and receiving costs. Furthermore, these technologies play a significant role in expediting supply procedures.

5.3.2. Impact of network technology on the bargaining power of suppliers:

Information technology enables the organization to establish communication channels with other suppliers, allowing for the identification of their products and services. This also facilitates negotiations, thereby diminishing the power held by the primary supplier. Suppliers, including those who offer raw materials, spare parts, and production equipment, refer to individuals or entities that contribute to economic activity by providing skilled labor and professional expertise.

In order to diminish their influence in this specific domain, particularly the authority of the unions whose conditions are enforced, numerous firms have turned to the automation of production processes as a means to decrease dependence on the workforce. Currently, information systems are also created to oversee the effectiveness of employees by connecting them to advanced incentive and wage systems, granting the administration a significant advantage in rewarding those who enhance productivity.

Additionally, suppliers now need to be cautious of organizations that have managed to create and implement intricate quality control systems. These businesses are currently employing these technologies to inspect shipments from suppliers, thereby asserting control over them.

5.3.3. Impact of network technology on the force of substitute products:

The Business can dissuade its clients from buying alternatives to its products by lowering pricing and associated services or by enhancing the performance and perceived worth of these items and services. The value of a commodity or service is determined by its capacity to satisfy the preferences and requirements of clients. If a client highly values a commodity or service, they are willing to pay a premium for it or seek alternatives from rival enterprises if it is not available from a particular enterprise.

Hence, network technology has given rise to interactive marketing, which offers products and services to clients in a manner that discourages their substitution with alternatives. Information technology enables the utilization of opportunities and the reduction of product delivery time and supply in the lowest possible timeframe.

5.3.4. Impact of network technology on the capabilities of new market participants:

Emerging competitors vie for market share and seize a portion of the revenues generated by enterprises operating in the same economic sector. Thus, these businesses hinder their participation in the market by utilizing various strategies related to their reputation, service quality, and distribution methods. Network technology is crucial in inhibiting new competitors from gaining a market share or entering the industry.

For instance, major airlines have implemented costly reservation systems to deter potential new rivals from entering the industry. These huge firms are connected to computer networks that are linked to tourism and travel agencies, as well as various hotels. These networks maintain comprehensive and permanent databases that record the clients that fly on the planes of these enterprises.

5.3.5. The impact of network technology on the competitive strength of businesses

in the same industry: Network technology has enabled companies involved in the same economic activity to successfully manage and compete with their rivals. An illustration of this is the implementation of Apollo booking systems, which have empowered airlines to engage in fierce competition both amongst themselves and against other carriers.

For instance, railway transport business have successfully developed communication networks to track the whereabouts of client freight and to compete with traditional cargo shipping firms. Information technology has a crucial role in decreasing fixed costs and storage length, resulting in the production of high-quality products at competitive prices.

5.4. Utilization of network technologies for cost reduction.

Enterprises can achieve cost reduction and productivity improvement by leveraging network technology in the following ways: Substituting private long-distance telephone calls with free email and internet-based communication services, thereby eliminating the associated burden and expenses; Eliminating the high costs of producing and transmitting mailing lists, technical bulletins, advertisements, and technical reports by freely publishing them on the internet.

Organizing virtual teleconferences allows for cost savings by reducing travel expenses. Minimizing paper use and associated resources by utilizing electronic document management to provide information instead of relying on email services. An illustration of this phenomenon is the utilization of the Internet by financial business, who have dedicated significant resources, including time and financial investment, to enable round-the-clock banking activities.

Online banking offers users convenient and unrestricted access to their accounts using user-friendly applications, eliminating the need for traditional banking services such as phone calls to customer care or email correspondence. Consequently, banks will decrease their allocations for employee training in customer care.

6. DISCUSSION AND RESULTS:

The paper elucidates how the deployment of network technologies can substantially augment both the internal and external functions of SMEs. Technologies such as the internet, intranet, and extranet are pivotal in streamlining internal and external communication processes, fostering operational efficiency.

Additionally, these technologies aid in the reorganization of human resources management and the refinement of information systems, leading to enhanced operational smoothness and cost reduction.

The integration of network technologies can significantly enhance the performance and competitiveness of SMEs in Algeria. The following key outcomes are identified:

- Enhanced Productivity:

SMEs that successfully integrate network technologies experience notable improvements in their productivity and overall efficiency.

- Strengthened Competitiveness:

By utilizing tools such as e-commerce, SMEs are better positioned to enter new markets and effectively respond to competitive pressures.

- Improved Decision-Making:

Access to real-time data facilitated by Net-Techs enables SMEs to make more informed and timely business decisions.

- Cost Reduction:

The adoption of digital communication channels and electronic management systems significantly reduces the costs associated with traditional operational processes.

7. Conclusion:

The implementation of Network Technologies (Net-Techs) plays a pivotal role in enhancing the effectiveness and efficiency of small and medium enterprises (SMEs) in Algeria.

Through the integration of information technology and communication systems, SMEs can streamline operations, reduce costs, improve decision-making processes, and enhance both internal and external communications. The utilization of Net-Techs allows businesses to respond more effectively to competitive pressures, adapt to market changes, and enter new markets with greater ease.

However, the full potential of these technologies is yet to be realized in Algeria, as many enterprises are still in the early stages of adoption. For SMEs to fully benefit from Net-Techs, it is essential to

continuously develop and update these technologies, ensure accessibility for all employees, and implement organizational changes that align with the new technological landscape.

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