Enabling Successful Business/Enterprise Collaboration with IT/IS

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ABSTRACT

"In an ever more globalized world, communication and access to information is not a luxury within firms, but a most important issue that used to improve collaboration within firms." Globalizing organizations, outsourcing, mobile work, inter-organizational teams, innovation, and reaching out to suppliers and customers are driving today's need to improve collaboration within firms. And information technology (IT) is at the center of these trends. This paper presents the successful business/enterprise collaboration with Information Technology (IT) / Information System (IS). Here looking first, why collaboration is needed?-discuss various kind of advantages and why collaboration is becoming so important and the business value it enables. Next, focuses on how IT changes the organizational (internal and external) environments, and the range and scope of collaboration. Finally, discusses the steps for successful collaboration, and the different effective Collaborative Software.

Keywords **- Business Collaboration, Collaboration Software, Effective Collaboration, Enterprise Collaboration, Organizational Environments, Scope of Collaboration, Successful Collaboration.**

I. INTRODUCTION

Collaboration is working together to achieve a goal, but in its negative sense it is working as a traitor. It is a recursive process where two or more people or organizations work together to realize shared goals, (this is more than the intersection of common goals seen in co-operative ventures, but a deep, collective, determination to reach an identical objective). Globalizing organizations, outsourcing, mobile work, innovation, inter-organizational teams, innovation, and reaching out to suppliers and customers are driving today's need to improve collaboration within firms. And, of course, information technology (IT) is at the center of these trends. A study on what makes widely-dispersed virtual teams effective found that, contrary to expectations, technology was a significant factor in facilitating their success [1]. However, there are literally hundreds of software packages being promoted for improving collaboration.

Furthermore, as new technologies appear, businesses are experimenting with different *types* of collaboration, such as virtual worlds, web applications, social networking, content management, and new ways of communicating (e.g., blogs, wikis, instant messaging, twitters, facebook, YouTube) and IT functions are often expected to *make collaboration happen* through the implementation of technology, even though technologies are only one piece of any collaboration initiative. Certainly, IT functions provide the "heavy lifting," such as connectivity and information integrity, without which most collaboration efforts would not be effective and a well-designed IT architecture is a key enabler of collaboration [2]. And, at the most basic level, IT also protects the privacy and security of information and users. To explore IT's role in enabling collaboration in organizations, and at the same time, what IT's role *should not be* (i.e., what responsibilities and accountabilities should properly be the function of the business), the authors convened a day-long focus group of senior IT managers from a variety of organizations.

Enterprise/Business Collaboration is a process in which the *right* people connect with the *right* expertise or information at the *right* time to drive the *right* business decision. In today's business world characterized by global competition, increased specialization of expertise and a fast pace of decision-making, collaboration is not just another buzzword ─ it is often the difference between success and failure. Described by one subject matter expert as "the fundamental starting point for…transformation, [without which] organizations will be unable to evolve their employees or processes1," enterprise/business collaboration is clearly an important success factor in today's knowledge-based economy. So why aren't there more companies investing in this important capability — one that can improve employee productivity, strengthen competitive positioning and drive new innovations? The answer often lies in the difficulty of developing the right collaboration strategy, synthesizing the optimal implementation plan, and estimating the credible Return on Investment (ROI). Drawing on the latest research and direct industry experience, this paper describes not only *why* organizations must develop a robust enterprise/ business collaboration strategy, but also *how*.

II. BUSINESS/ENTERPRISE COLLABORATION TRENDS

There are major trends that make enterprise/business collaboration increasingly vital for success. They are [3]:

1. *Globalization:* Every company in today's world is affected by globalization, and the more globalized the business is (or wants to be), the more important enterprise/ business collaboration becomes. Cisco reports that 'Web 2.0 and social networking technologies are making (Cisco's) globalization efforts far more effective than was previously possible.' The world seems to be getting smaller. Events in a faraway land can impact others in another part of the globe. As a result, a major theme in today's world is globalization, whereby companies seek to offer their goods and services around the world. However, the worldwide spread of brands and the emergence of global institutions are encountering major backslashes from groups, and even nations that want to maintain their local identity. Companies feel this backslash in their use of IT: locales and regions want system that suit their culture, preferences, or ways of working. In addition, they want to jobs to stay put, not move to far-off country. In response, IS executives are seeking to achieve the balance between implementing a single enterprise wide

IT infrastructure and tailoring systems to fits local needs- and locating work where it is best performer.

2. *E-enablement:* Doing business electronically has been fundamental use of computers since the 1950s, but now the internet has become a hub for conducting business. The before internet economy is transforming into an electronic economy where clicks and bricks exists side by side. The dot-com crash might have seemed a hiccup in the increasing use of the internet for business and commerce. However, it has not deterred companies from e-enabling their businesses, that is, integrating the internet into how they work. In general, the term e-business has the broad connotation doing business electronically. E-business has much to do with building e-enabled relationship with consumers and other enterprises, not just performing transactions electronically. E-commerce on the other hand, is being used in the more limited sense of buying and selling electronically, as in handling commerce transactions.

3. *Distributed Expertise and Partnerships:* In today's global economy, employees often have to coordinate efforts with people all over the globe. In research conducted by SDL, 59% of the surveyed considered their teams geographically dispersed. Not surprisingly, more and more companies consider harnessing the 'power of the masses' across functional / geographic boundaries a critical success factor.

4. *Knowledge Sharing and Knowledge Management:* In this theme is how to deal with all of the world's knowledge. Once aspect of this is the transfer of knowledge between people (sharing), because the most important assets in enterprises is the people and the knowledge they process. The other aspect is the transfer knowledge from people's heads into lasting things, such as processes, products, practices, databases, directories software, and such.

III. WHY NEED COLLABORATION

Today, the most effective modes of information sharing and problem-solving are driven by a flatter, more collaborative organization. To power this organization, the world has moved towards acquiring information technology (IT) as a service, with flexible and adaptable applications and

operating models. There is no doubt that information and communications technologies are enabling different ways of working—within organizations and between them. Who could imagine life or who could spend life without e-mail? Without Google? Without cell phones? Without internet? Without personal computer? These technologies and others have changed forever how we interact with others, both personally and professionally, how we share information, and *where* work gets done. Thus, it should be no surprise that there is strong interest in collaboration among business practitioners and academics alike.

In an open economy with changing customer preferences, shifting industry boundaries, and emerging global competition, firms need to build capabilities for constant innovation. To build such innovative capabilities, contemporary enterprises need to collaborate with other enterprises, entities and institutions and leverage outside resources and knowledge. Along with the innovation process from closed to chainlinked and open, inter-organizational collaboration has become a major way giving birth to innovation. Thus, collaboration with partners and innovation building are two business challenges critical for firms' success, which are not isolated with each other. In a collaborative innovation process, IT plays a more and more important role in enabling technological change and innovation development (Clemons and Row 1991). This is because IT revolutionarily facilitates inter-organizational collaboration, such as the digitally enabled integration in supply chains (Rai et al. 2006). Firms become increasingly rely on electronic interconnections to enhance competitive advantage in operational excellence, customer relationship, product and service offerings, and revenue growth (Krishnan et al. 2007).

One company has invested substantial amounts of time and money in collaboration technologies and in adapting its organizational culture and behaviors accordingly and believes that they have become more productive, effective, and successful as a result.
Some examples of the benefits that enterprise/business can reap from collaboration are:

1. *Cost savings:* In a number of focus-group companies, collaboration is seen as having real cost savings potential in such ways as reducing travel costs through virtual meetings, improving communication, and enabling remote access to documents. Participants noted that collaborative technology facilitates the work of global and virtual teams by compressing work flow, reducing development costs, increasing communication, minimizing misunderstandings, improving

coordination between groups, and enabling linkages with vendors, suppliers, and customers which speed up the supply chain and other work processes.

- *Outsourced management costs:* As outsourcing trends increase, so do the costs of managing these arms-length relationships. Enabling collaboration across the extended enterprise can both reduce such costs (e.g., miscommunication, re-work on products, and missed deadlines) and enable greater effectiveness.

- *Travel / printing costs:* By replacing internal meetings and live events with virtual, collaborative events, wherever appropriate, organizations can save millions. It is estimated that, on an average, a remote teleconference saves up to 98% of the live face-to-face meeting costs.

- *Falling Cost of Communications:* It is a well-known fact, one that has been reiterated in a recent McKinsey report, that communications costs have been falling dramatically, especially following the fiber-optics glut of the late 1990s and the ensuing dot.com bust. A three-minute, NY-London call would cost about $3.32 in 19906, but today a similar call can be made for pennies using VoIP.

2. *Flexibility:* The world is becoming increasingly volatile, uncertain, complex, and ambiguous, and this is creating a highly dynamic business environment for many companies. Flatter, more networked and collaborative structures create the right work and leadership environment facilitating fluid workforces and speedy decision-making, and providing transparency of information and capabilities while retaining clarity around the organization's beliefs, values, and responsibilities. A networked organization, with less structure, and situational leadership, and with the ability to create new capabilities through its networks will be much more able to cope with these challenges. Flexibility will involve space, technology, and protocols for working in networks and will exist at the intersection of real estate, HR, and IT. It underlies many of the reasons why focus group members are interested in collaboration. While most are still seeing this as a need *within* a more traditional, hierarchical organizational structure, some recognize that their structure and

governance practices will have to change substantially.

3. *Being wrong early, being right more often:* The ability to quickly test new ideas and make necessary iterations is a strategic advantage. 'Fast-to-failure' is often as important as 'fast-to-success' in today's demanding marketplace, where a 40% success rate is considered exceptional.

4. *Reducing error rates and re-work time:* An estimated 35% of all scientific, marketing, engineering and sales research dollars are wasted in re-work. Even a modest 10% reduction in re-work through improved collaboration would result in millions of dollars in cost savings for most medium or large enterprises.

5. *Accessibility of information:* One of the biggest benefits of collaboration and its associated technology is that it makes information much more accessible than in the past. Information repositories, such as the Intranet, enable the management and sharing of digital content on an as needed basis [4]. Other technologies, such as wikis, support the creation of new content and its publication. These tools enable information and knowledge sharing across time and space in ways that were unheard of a mere decade ago [5]. Many focus group members believe that portal and content management applications will be the biggest value of collaboration. But they also feel it will take a lot of work to get there. "Our Intranet is just a garbage scow of information," sighed one manager. "The same document can exist in literally hundreds of places." Another noted, "While our corporate level content is well-managed, it gets messier and messier the lower down in the organization you go. We need much more information management and filtering to make our Intranet really useful." Finally, while everyone agrees that collaboration will only be successful if more information is made more widely available, there is still a great deal of fear that "someone will do something bad with it," which explains why, in many organizations, the default position is *not* to share.

6. *Effectiveness:* There is wide recognition that collaboration technology, used properly, can make group work more effective. This is particularly true for virtual teams. For example, one focus group company uses social networking technologies (behind its firewall) to enable team members from around the world to learn about each other, have fun events, and understand each others' customs and culture. "This has been really useful for us in building strong global teams," said the manager involved. Collaboration technology, particularly unified communications, is especially useful in

integrating remote and mobile workers seamlessly into team or project activities. It enables them to "touch down" in an office and plug into the applications and information they need, wherever they are in the world. Increasingly too, for many professionals, whose work consists of participation in a number of ad hoc projects, collaboration technology enables them to more effectively juggle a variety of commitments. One firm uses it extensively for its multidisciplinary projects, such as pandemic planning. Finally, online education is a big application of this technology, allowing employees to participate from a variety of locations, have virtual and real time discussions, and incorporate learning into the demands of their workday.

7. *Leveraging investments:* This wave begins in the 1970s and concentrated on making more effective use of corporate assets to increase profitability. Systems were justified return on investment and increasing cash flow.

8. *Enhancing products and services:* This wave began in the 1980s and was the first time that attention shifted to using IT to produce revenue by gaining strategic advantage or by creating entirely new business. In conjunction with the new goals of using IT to grow the business or increase market share, IT was to improve outward-looking functions, such as marketing, distribution, and customer service.

9. *Enhancing executive decision making:* This wave began later in the 1980s and focused on changing the fundamental structure of the organization as well as creating real time business management system.

10. *Reaching the consumer:* IT is used to communicate directly with customers, leading to new marketing, distribution, and service strategies. This wave changes the rules of competition, which has been precisely the focus of leading edge firms- to restructure their industry by creating new businesses using the internet, e-commerce and now wireless technologies.

11. *Accessibility of people:* A key feature of collaboration and its associated technology is that it provides a company with access to a much broader range of skills, capabilities, resources, and services than have been traditionally available. Collaboration technology significantly expands the number of potential partners and expertise available to a company and, in recent years, different types of inter-organizational alliances- from supply chain integration to design coordination to innovative partnerships

have become commonplace [6]. However, it is the ability to access *internal* expertise that is currently of most interest to the focus group companies. Only one firm had successfully implemented a comprehensive enterprise directory, including phone book, expertise location anywhere in the organization, reporting structures, and connection with social networking information.

IV. HOW IT CHANGES ORGANIZATIONAL ENVIRONMENTS

How IT is used depends on the environment surrounding the organization that uses it. This environment includes economic conditions, characteristic of principal resources, management philosophies, societal mores, and other factors. This environment changes constantly. Simultaneously, technological advances affect the way IT is used. IT changes the organizational environment including external business environment and internal organizational environment [7].

4.1. Changes the External Business Environment
Today, the turbulent business world includes shorter and shorter product cycles, a U.S. telecommunications industry in turmoil, investor doubts about corporate truthfulness, and terrorism. IT contributes this turbulence because it allows information to move faster, increasing the pace at which individuals and organization can respond to events. The following are the main changes taking place in our global marketplace.

1. ***The Internet Economy:*** This economy began with business-to-consumer (B2C) retailing, selling over the World Wide Web. The pioneer of the web only business model was Amazon.com. The action then moved to business-to-business (B2B), with buyers and sellers using internet exchanges to find consummate business deals.

2. ***Global Marketplace:*** The entire world has become the marketplace. To succeed large companies believe they need to global, meaning huge and everywhere. In addition, the internet enables companies to work globally-three main operating arenas, Asia/Pacific, the Americas, Europe and the Middle East and Africa (EMEA). The Internet also allows small firms to have a global reach.

3. ***Business Ecosystems:*** A new term is creeping into the business lexicon: ecosystem. An ecosystem is a web of relationships surrounding one or a few companies. For example, Microsoft and Intel are the center of the Wintel ecosystem that has dominated the PC world. The point about ecosystem is that they appear to follow biological rules rather than industrial-age, machine-like rules.

4. ***Decapitalization:*** Tangible items, such as capital, equipments, and buildings, were the tenets to power in the industrial age. Today, intangible items, such as ideas, intellectual capital, and knowledge, have become the scarce, desirable items. We could say that the business world is moving from tangible to intangible: it is decapitalizing.

5. ***Faster Business Cycles:*** The tempo of business has accelerated appreciable: companies do not have as much time to develop new products or services and move them into the marketplace. Once on the market, their useful lives tend to be shorter as well, so speed has become of the essence. Efforts to accelerate time to market or to reduce cycle time often depend on innovative uses of IT.

6. ***Accountability and Transparency:*** The rise and fall of dot-coms probably should have been expected; some of their business plans truly could not make money. However, the ensuing debacle in the overbuild telecommunication industry and the corporate financial shenanigans in several industries around the world have shaken investor confidence and led to calls for greater transparency of corporate operations and greater accountability of corporate officers. These events are likely to increase the pressure for corporate ethics. IT will surely play a role in implementing the ensuing regulations and fostering transparency. Discussions of IT ethics might also increase.

7. ***Rising Societal Risks of IT:*** IT has negatively affected millions of people-through network shutdowns, computer viruses, identity thefts, e-mail scams, movement of white-collar jobs to low cost countries, and such-which has to increasing calls for government regulation and for vendors and corporations to take action.

4.2. Changes the Internal Business Environment
The work environment also changing and the art of managing people are undergoing significant shifts. These changes are profound enough to change organizational structures. Frances Cairncross, management editor at the Economist, write in her book "*The company of the future* that "the
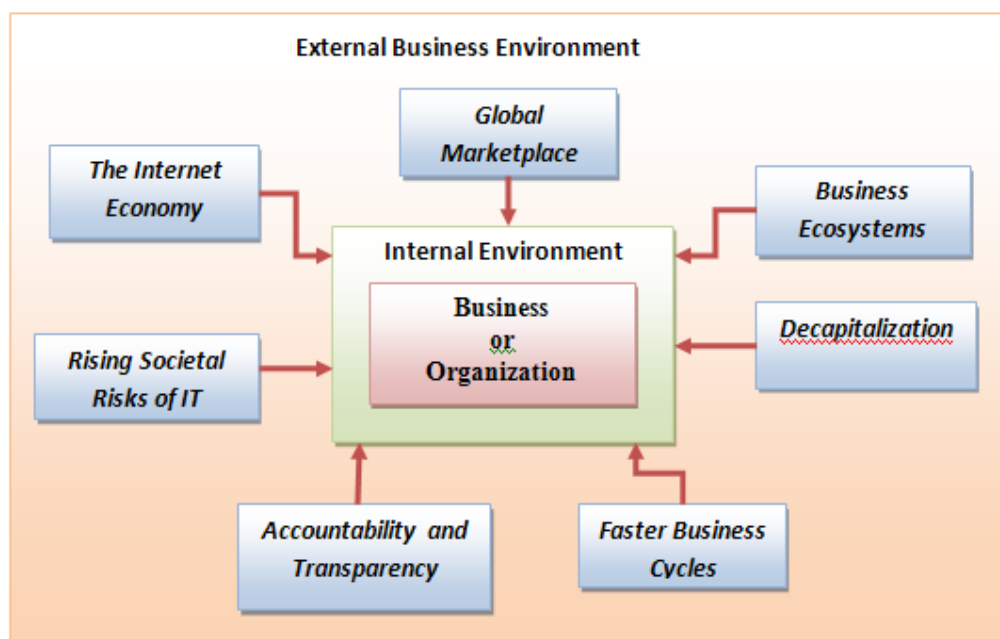
Fig.1: The terms that IT changes the organizational environment.

relationship between IT and enterprise structure is going more widespread and deeper."

1. ***From Supply-Push to Demand –Pull:*** In the industrial age, companies did their best to figure out what customer wanted. Firms were organized to build a supply of products or services and then "push" them out to end customers on store shelves, in catalogs, and such. The Internet, which allows much closer and one to one contact between customer and seller, is moving the business model to demand pull. In this model, companies offer customers the components of a service and product, and the customers create their own personalized visions, creating the demand that pulls the specific product or service they want through the supply chain, or rather, the demand chain.

2. ***Self-Services:*** Bank automated teller machines (ATMs) were an early example of customer self services. The 1990s saw an increase in systems that let customer access corporate computer systems to purchase products, inquire about the state of an order, and in general, do business with the firm online on their own. FedEx was one of the first companies to leverage the Web by allowing customer to directly access its package-tracking system via its homepage.

3. ***Real-Time Working:*** A term that has been around for at least 15 years but has only recently gained traction is the real-time enterprise. The genesis of this notion, we believe was the military, whose personnel fly planes and drive tanks using instrument panels. These panels show the pilots and soldiers the surrounding terrain as it exists at the moment, so that they can respond to changes and threats in real times. For example, member of a sells team about to talk to a potential global customer can have up-to-the-minute information about the customer-late –breaking news about the company, recent management changes, latest orders to the company, sales tips from other employees-all gathered for them from many sources.

4. ***Team-Based Working:*** The trend is toward people working together on projects. Rather than depending on chains of command and the authority of the boss, many organizations emphasize teams to accomplish majors tasks and projects. Groupware provides IT support for meeting, collaborative work, and communications among far-flung team members. Cairncross believe the increased ability to collaborate in new ways using IT is one of the forces driving the changes in organizational structures and their enterprises that use the technology to work in new collaborate ways will be the winners.

5. ***Anytime, Anyplace Information Work:*** Information workers are increasingly mobile, so computers are needed not just for accesses information, but also for communicating with others. One of the hallmarks of IT today is that the

communication capabilities of computers are seen as more important than their computing capabilities. Communication technology has developed to the point where information work can be done anywhere with laptop computer, cell phone, or PDA. Electronic mail, voice mail and instant messaging (IM) cross time zone s to allow work to be conducted anytime, anywhere.

Outsourcing and Strategic Alliances: To become more competitive, organizations are examining which work they should perform internally and which they should give to others. Outsourcing, having a third party perform information work for us, may be a simple contract for services or a long term strategic alliance. Between these two extremes are a variety of relationships that are redefining the way organization work together.

V. THE RANGE AND SCOPE OF COLLABORATION

These days, we can describe the range and scope of collaboration in organizations by simply answering the following W^3H (means three W questions and one H question) questions. They are-

W_1 - *who* is involved in collaboration?
W_2 - *what* type of work is being done?
W_3 - *where* it is being done?
H - *how* to achieve the effective collaboration?

Firstly, who is involved in collaboration? The organizations, persons, customers, sellers, buyers, internal and external working team of the organization, and others are involved in collaborating to achieve their business goals and objectives. They are easily communicates with each other and they also can share their knowledge and information by enabling collaboration with IT. In modern organizations, this covers a lot of territory. Sometimes collaboration can

be as basic as two people working together to achieve a goal, but it also refers to a wide spectrum of different types of collaborative participants. In organizations, there can be collaboration within teams (both formal and ad hoc), between business units, and within communities of interest. Collaboration can also occur beyond a firm's boundaries, including between an organization and its customers; between one or more organizations (as in a supply chain or an innovative partnership); and, as we are beginning to see, with the world at large (also known as "mass collaboration"). As organizations have become more comfortable with collaborative work, they are extending it in new ways and to more and more types of participants.

Secondly, what type of work is being done? They are collaborating simple transactions (These included e-mails, conferencing, extranets with partners, and basic workflow), collaboration around routine activities, such as access to information and its reuse, ease of information creation and publishing; coordination of experts to solve common problems and to reduce the work involved in mundane tasks, such as coordination and planning, the development of communities for various purposes; creating collaborative work environments where innovation can occur; and collaboration for issue and information management. They are also collaborating real time and dynamic activities, decisions making, knowledge sharing, information and data sharing, team base activities, and other important things. Dynamic collaboration is characterized by: speed of decision-making with incomplete information; the ability to modify decisions in response to changing conditions; trial and error; the continual need to address and deal with risk; hyper-transparency of information; and situational leadership [8].

Thirdly, where it is being done? The business and enterprise collaboration can be done Globally- using the Internet. The Internet is the most important medium of collaboration. Using the Internet the effective collaboration with IT can be done more easily and perfectly. The collaboration can also be done by mobile, virtually, and on-site. Today's effective collaboration is depends on these mediums. Increasingly, collaboration needs to take place on an anywhere, anytime basis. Inside organizations, members noted the need for more meeting spaces and meeting rooms, as well as "touch down" areas where contractors and outside staff can temporarily set up office. Almost all focus group organizations already support virtual and mobile work, at least to some extent. Several members of the focus group also routinely utilize international or global teams where collaboration takes place across time zones, national boundaries, cultures, and language groups.

Finally, how to achieve the effective collaboration? Collaborative technology comprises the tools that are used to facilitate the work of collaboration. The technologies are e-mail, instant messaging, blogs, social networking, chatting, video conferencing; meeting software, audio conferencing, screen sharing, file sharing, activity assignment, task management, data and information sharing, publishing tools, enterprise directories, and other important technologies.

VI. STEPS FOR SUCCESSFUL COLLABORATION

6.1. Develop an articulate vision

Effective collaboration requires a multidisciplinary approach and a shared business- IT vision. It is essential that such a vision begin with understanding the organization's values, legal requirements, and core intellectual property. From this, a strategic perspective can be developed about what the business wants to accomplish with collaboration and what types of technology would best support it. Focus group members suggested that developing a vision for collaboration must be carefully approached because "the judgment line is shifting rapidly" and our static paradigms of work are rapidly becoming much more dynamic. These factors will change business models and strategies and affect how companies will need to manage the complex business environment of the near future. Ideally, a vision for collaboration should include a unified strategy and business models, tools, and experiments to help the organization gain further insights. Its ultimate goal should be to nurture an internal working environment (and in the longer term, a broader business ecosystem) that will enable productive collaboration to emerge. At this early stage, both business and IT leaders should play a key role in articulating a

so fast that is tempting to say, "Why bother?" On the other hand, most organization survival depends on IT, so planning its effective use is a matter of organizational life and death. It is important to establish the appropriate mindset for planning. Although some manager believes planning means determining what decisions to make in the future, this view is untenable today because the business environment is so turbulent, making the future unpredictable. A better view is that planning is "developing a view of the future that guides decision making today."

Information technology (IT)- computers and telecommunication- is having the kind of revolutionary, restructuring impact that has been expected and touted for years. The rapid advances in the speed and capacity of computing devices, coupled with the pervasiveness of the Internet, digital storage, wireless and portable devices, and multimedia content are causing major changes in the way we live and work. Managing and operating IT for managing and operating organizations has been a field of practice for some 50 years. First known as business data processing and later as management information
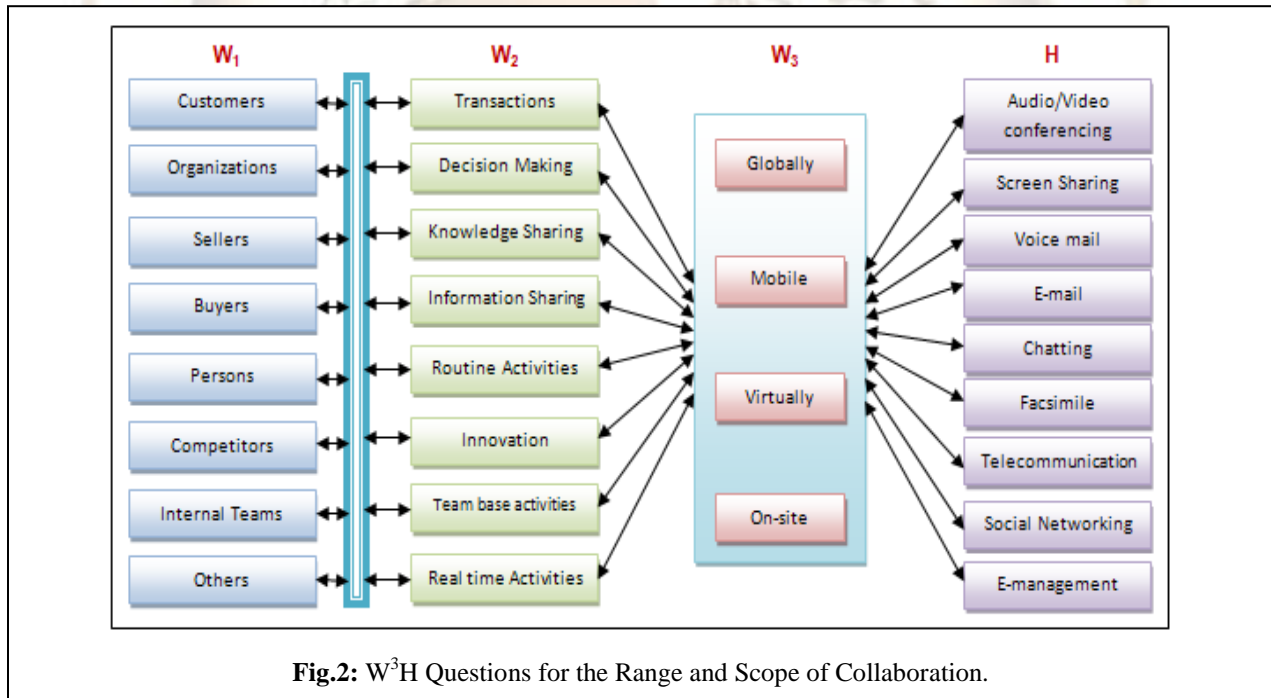

Fig.2: W^{3}H Questions for the Range and Scope of Collaboration.

collaboration vision and in connecting it to the right people who can make it happen.

6.2. Information System Planning

IS management is becoming both more difficult and more important, especially in strategic systems planning. On the one hand, the technology is changing

system (MIS), the field is now called information technology (IT). We need to collaborate with IS/IT to improve the organizational performance and to achieve the organizational goals and objectives.
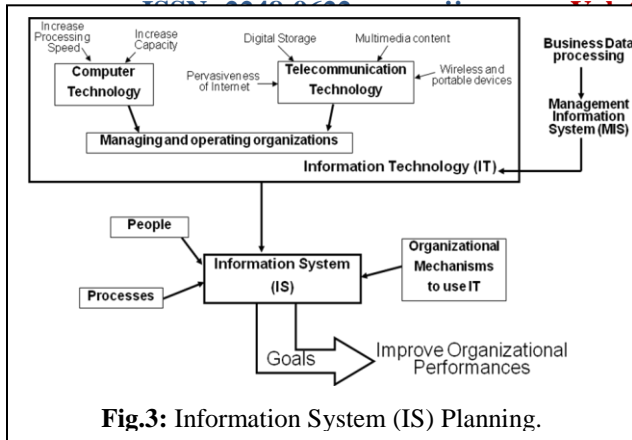
Fig.3: Information System (IS) Planning.

6.3. Establish Principles of Behavior

As noted above, much of the governance of collaboration is based on principles rather than rules. The most basic principle is transparency, not only of information but also of behavior [9]. Some focus group companies have already established a code of conduct to govern electronic communication and collaboration, while others are working on one. A big fear is that providing improved communication will enable employees and customers to post negative comments about the organization. One important way of allaying these fears is to eliminate online anonymity. "Anonymity results in bad behavior," said one manager. "With a clear online identity, negativity is quickly found out and is usually selfpoliced by others in the community." Another noted, "In a business environment where all posts are traceable, abuse is unlikely." As social networking takes hold in our culture, and organizations explore ways they can use it to connect with their customers, they are realizing that establishing rules of etiquette for how to do this is important."We have a hard and fast rule that if you are using social networking to do business, you *must* state your company affiliation," said a manager.

6.4. Management of Information System (IS)

IT is used in space exploration, weapons systems, medicine, entertainment, and many other aspects of human activity, the majority of information technologies are used in managed organizations. The process of managing IT in organization is becoming increasingly complex as it becomes more important. To illustrate why, here are just three major trends that impact IT management:

1. Governance of IT, that is deciding who makes which IT decisions, is shifting from being handled exclusively by IS executives to being a collaborative effort between IS and the business.

2. The role of IS is shifting from application delivery to system integration and infrastructures development.

3. Outsourcing is becoming a way of life for many IS organizations, to the extent that major responsibility of IS is developing and managing relationships with external service providers (ESPs).

6.4.1. Managing the Essential Technologies

Way back in 1964, Paul Baran at the Rand Corporation wrote a paper about distributed systems. At the time, computing meant mainframes and hardware terminals; distributed system were just theory. Today, distributed systems are the architecture of choice. The degree to whice is a distributed can be determined by answering four questions:

1. Where is the processing done?
2. How are the processors and other devices interconnected?
3. Where is the information stored?
4. What rule or standard are used?

Distributed Processing: This is the ability for more than one interconnected processor to be operated at the same time, typically for processing an application on more than one computer. The goal in distributed processing is to move the appropriate processing as close to the user as possible and to let other machines handle the work they do best. An advanced from of distributed processing permits interoperability, whish is the capability for different machines using different operating systems on different networks to work together on tasks. They exchange information in standard ways without requiring changes in functionality or physical intervention.

Connectivity Among Processors: This type of connectivity means that each processor in distributed system can send data and manages to any other processor through electronic communication links. A desirable structure for reliable distributed systems has at least two independent paths between any two nodes, enabling automatic alternate routing in case one node goes down.

Distributed Database: These are being defined in at least two ways. One divides the database and distributes its partitions throughout a system without duplicating the data. Any portion is accessible from any node, subject to access authorization. Users do not need to know where a piece of data is located to access it, because the system knows where all data is stored. The second type of distributed database stores

the same data at several locations with one site containing the master file. Synchronization of data is a significant problem in this approach, which is why it has not been preferred way to distribute data.

Systemwide rules: These rules meant that an operating discipline for the distributed system has been developed and is enforced at all times. These rules govern communication between nodes, security, data accessibility, program and file transfers, and common operating procedures.

6.4.2. Managing Telecommunications
The telecommunication in the broadest sense: electronically sending data in any form from one place to another between people, machines, or objects. In this view, the telecommunication system is an electronic highway system. Generally, IS departments have been responsible for designing , building and maintaining that information highway in the same way that governments are responsible for building and maintaining streets, roads, and freeways.

6.4.3. Managing Information Resources
Managing information resources initially meant managing data, first in files, then in corporate database that were well structured, carefully defined, and generally under the jurisdiction of the IS department. Next, the term expanded to include information; that is data that has meaning. There also has been much talk of managing knowledge. With the emergence of the internet, talk has turned to managing content, which include text, graphics, sound, video, audio, and animation. Managing them all is now included in our discussion of information resources.

6.5. Security and risk
Information security refers to protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction. The goals of information security include protecting the confidentiality, integrity and availability of information. All organizations, including governments, military, financial institutions, hospitals, and private businesses, gather and store a great deal of confidential information about their employees, customers, products, research, and financial operations. Most of this information is collected, processed and stored on electronically and transmitted across networks to other computers. Protecting confidential information is a business requirement, and in many cases also an ethical and legal requirement. For the individual, information security has a significant effect on privacy and identity theft.

The field of information security has grown significantly in recent years. There are many areas for specialization including Information Systems Auditing, Business Continuity Planning and Digital Forensics Science, for example. There are also specific information security technical certifications that can assist getting started in this field.

6.6. Communication and Technology integration
A significant and growing area of collaborative technology is enabling a wide spectrum of communications options, from voice mail to video and everything in between. "Users increasingly see communications and collaboration not as separate activities but as a smooth continuum of modalities where the difference between talking on the phone and posting on a wiki becomes a matter of choice and preference." [10]. As such, unified communications become a technological reality. IT leaders will need to develop an architecture that supports them as a single technology spectrum rather than as separate components. Gartner Group predicts that phone directories, e-mail, voicemail, instant messaging, presence awareness, computer telephony, and conferencing technologies will increasingly converge over the next five years, leading to serious organizational challenges in how these services are managed [10]. However, other types of communication and collaboration software, such as voice, call centers, mobile, team workspaces, and social software will *not* be part of this convergence and will have to be appropriately managed as they too evolve. Ultimately, communications technology will be embedded in all business applications, and will need to be ubiquitous, reliable, secure, and integrated [11].

VII. COLLABORATIVE SOFTWARE
Collaborative software (also referred to as groupware, work group support systems or simply group support systems) is computer software designed to help people involved in a common task achieve their goals. It is usually associated with individuals not physically co-located, but instead working together across an internet connection. It can also include remote access storage systems for archiving common use data files that can be accessed, modified and retrieved by the distributed work group members.

Collaborative software is a broad concept that greatly overlaps with Computer-supported cooperative work (CSCW). Some authors argue they are equivalent. According to Carstensen and Schmidt (1999)[12] groupware is part of CSCW. The authors claim that CSCW, and thereby groupware addresses "how

collaborative activities and their coordination can be supported by means of computer systems". Software systems such as email, calendaring, text chat, wiki, and bookmarking belong to this category. It has been suggested that Metcalfe's law — the more people who use something, the more valuable it becomes — applies to these types of software. Whereas the more general term social software applies to systems used outside the workplace, for example, online dating services and social networks likeFriendster, Twitter and Facebook, the use of collaborative software in the workspace creates a collaborative working environment (CWE). A collaborative working environment supports people in both their individual and cooperative work thus giving birth to a new class of professionals, e-professionals, who can work together irrespective of their geographical location.

Finally collaborative software relates to the notion of collaborative work systems which are conceived as any form of human organization that emerges any time that collaboration takes place, whether it is formal or informal, intentional or unintentional[13]. Whereas the groupware or collaborative software pertains to the technological elements of computer supported cooperative work, collaborative work systems become a useful analytical tool to understand the behavioral and organizational variables that are associated to the broader concept of CSCW [14].

7.1. Groupware
The term *groupware* can be traced as far back as the late 1980s, when Richman and Slovak (1987) [15] wrote:

"Like an electronic sinew that binds te ams together, the new groupware aims to place the computer squarely in the middle of communications among managers, technicians, and anyone else who interacts in groups, revolutionizing the way they work."

Even further back, in 1978 Peter and Trudy Johnson-Lenz coined the term groupware; their 1978 definition of groupware was, "intentional group processes plus software to support them." [16]. In the early 1990s the first groupware commercial products began delivering up to their promises, and big companies such as Boeing and IBM started using electronic meeting systems to leverage key internal projects. Lotus Notes appeared as a major example of that product category, allowing remote group collaboration when the Internet was still in its infancy. Kirkpatrick and Losee (1992) [17] wrote then:

"If GROUPWARE really makes a difference in productivity long term, the very definition of an office may change. You will be able to work efficiently as a member of a group wherever you have your computer. As computers become smaller and more powerful, that will mean anywhere."

As collaborative software evolves and migrates into the Internet itself, it contributes to the development of the so called Web 2.0 bringing a host of collaborative features that were originally conceived for within the corporate network. These include functionalities such as document sharing (including group editing), group calendar and instant messaging, web conferencing, among others. The study of computer-supported collaboration includes the study of collaborative software and social phenomena associated with it.

7.1.1 Supporting "Same Time/Same Place" Collaboration
Supporting "Same Time/Same Place" Collaboration has generally meant supporting meetings, and a lot of work has focused on this area. One study found that the average executive in a U.S. company spends more than 800 hours a year in meetings. Not only does this figure represent a large option of total work hours (on the order of 30 percent), but even worse, the executives reported that they considered about 240 of those hours to have been wasted in useless

Fig.4: Groupware Options
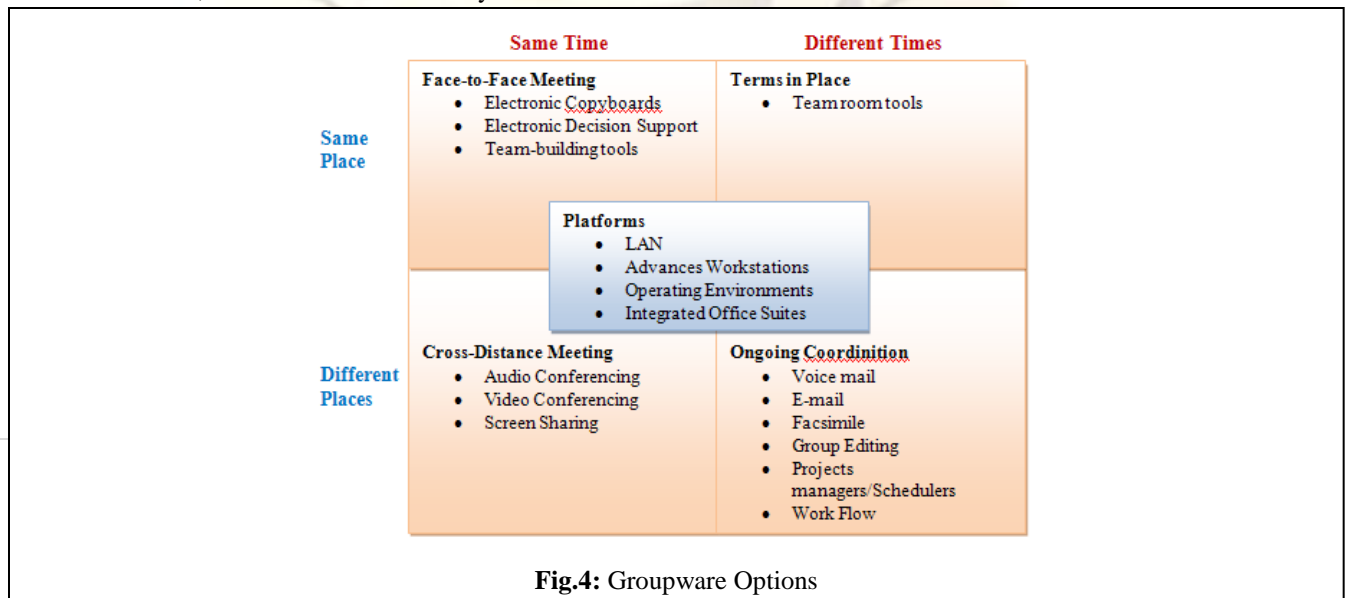
meetings. Supporting "Same Time/Same Place" Collaboration that can improve meetings are to (1) eliminate some meetings, (2) encourage better planning and better preparation for those meetings that must be held, and (3) improve the effectiveness of meetings that are held.

7.1.2. Supporting "Different-Place" Collaboration

One of the most promising uses of groupware is ongoing coordination by groups who work in different places, and perhaps at different times. With the increasing marketplace emphasis one cycle time reduction, companies can use the globe and its three main regions (Europe, Asia, and the Americas) to extend their workday to around the clock by passing work from groups in one region to the next at the end each one's workday as the following personal example attests.

7.2. The Three levels of collaboration

Groupware can be divided into three categories depending on the level of collaboration [18]:

1. *Communication* can be thought of as unstructured interchange of information. A phone call or an IM Chat discussion are examples of this. Examples include: synchronous conferencing, asynchronous conferencing, e-mail, faxing, voice mail, Wikis, Web publishing, revision control.

2. *Conferencing* (or collaboration level, as it is called in the academic papers that discuss these levels) refers to interactive work toward a shared goal. Brainstorming or voting are examples of this. Examples include:
   Internet forums, Online chat, Instant Messaging, Telephony, Videoconferencing, Data conferencing, Application sharing, Electronic meeting systems (EMS).

3. *Co-ordination* refers to complex interdependent work toward a shared goal. A good metaphor for understanding this is to think about a sports team; everyone has to contribute the right play at the right time as well as adjust their play to the unfolding situation - but everyone is doing something different - in order for the team to win. That is complex interdependent work toward a shared goal: collaborative management. Examples include: electronic calendars, project management systems, workflow systems, knowledge management systems, enterprise bookmarking, prediction markets, extranet systems, social software systems.

VIII. CONCLUSION

"For many employees today, collaborative, complex problem solving is the essence of their work. These 'tacit' activities — involving the exchange of information, the making of judgments, and a need to draw on multi-faceted forms of knowledge in exchanges with coworkers, customers, and suppliers — are increasingly a part of the standard model for companies in the developed world."

Thus begins a McKinsey article on competitive advantage. In today's competitive environment, business/enterprise collaboration is a key strategic challenge and a tremendous benefit driver for companies across industries. On the one hand, trends such as globalization, increased skills specialization, innovation imperatives, and distributed expertise / partnerships make business/enterprise collaboration *necessary*. On the other hand, trends such as falling cost of communications and widespread adoption of Web 2.0 technologies (especially in our daily lives) make investing in the enabling technologies more *attractive* from cost and utility standpoints. Visionary companies that both understand this imperative and the opportunity have already started to achieve significant benefits — one multinational saving $691 million a year and another enterprise quintupling its revenues within a year. While the benefits will surely vary from industry-to-industry, company-to-company, and even process-to-process, it is now well established that business/enterprise collaboration technologies have come of age.

Collaboration is a complex concept with uncertain benefits and requiring major organizational change. The drive to adopt collaboration is being accelerated by the possibilities enabled by information technology, which support real time global communication and anytime–anywhere access to information. In addition, companies are feeling considerable pressure to adopt collaboration technology because of their increasingly widespread use among individuals, many of whom are becoming their employees. There is no question that collaboration will play a major role in how we work and live in the future. However, as we move into this new era, companies are taking their time to determine how best to take advantage of what collaborative technology has to offer. This article has identified the major ways companies might want to collaborate and the benefits that are anticipated from each. It has also explored some of the major characteristics and components of collaboration in order to clarify concepts and to distinguish between the work of collaboration, which is a human activity, and collaboration technology, which facilitates it. It has

shown that effective collaboration will *not* result from simply implementing more collaboration software. Instead, it will require a proactive and holistic strategy that integrates business goals and technology potential. At present, all aspects of collaboration and collaboration technology are in their infancy, so it is understandable that many companies are proceeding cautiously into this new world. Nevertheless, the speed with which both technology and practice are

moving strongly suggests that it is time for managers to put some collaborative fundamentals in place. Furthermore, IT managers have an opportunity to provide business leadership around collaboration if they can clearly articulate its business potential and benefits, rather than focusing on the technology itself. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions. Authors are strongly encouraged not to call out multiple figures or tables in the conclusion—these should be referenced in the body of the paper.

A conclusion section must be included and should indicate clearly the advantages, limitations, and possible applications of the paper. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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