

Software project management

Q.) What are the **Challenges Managing ITOT**

Ans.)

Challenges of In-House IT Operations Management (ITOM) Services

The IT environment is evolving at an alarming rate, making it difficult for companies to keep up with ever increasing business needs. Moreover, with the adoption of new technologies such as cloud computing, mobility, virtualization and the Internet of Things, integration processes are a major challenge for **IT Operations Management (ITOM)** teams. While small and medium sized enterprises partner with managed services providers to cater to business demands of their clients, large sized companies are hesitant to outsource their services with the belief that they have adequate resources to meet requirements.

What large companies do not realize is that, by providing in-house managed services, high rate of inefficiencies and costs are typically incurred especially in connection with IT operations management. According to a Microsoft finding, 70% of IT budgets are spent on managing infrastructure – servers, operating systems, storage, and networking.

In-House IT Operations Management Challenges

The major challenges companies need to address while providing **in-house managed services** include:

1. Unreliable IT Operation Management Tools

Inconsistent and inefficient IT operation management tools invariably result in increasing costs as they lack the capabilities to share information and communicate.

2. Limited Visibility of IT Architecture of Legacy Systems

The visibility of legacy systems and traditional IT architecture is limited. Managing IT infrastructure of enterprise clients is difficult due to independent functioning of technologies, processes and tools.

3. Unprecedented Utilization of Resources to Manage Processes

High resource utilization to provide constant attention on IT operation management processes make it unsustainable.

4. Limit on Scalability of Operations

Limitation of scaling up the portfolio of managed services in relation to growing businesses of clients.

In today's complex environment, **IT operations management** is complicated. Big companies need to understand that sometimes the benefit and reduction of cost in partnering with managed service is much higher than attempting to manage IT operations in-house. A recent study reveals that 46% of enterprises that use managed service providers to take care of their IT needs have reported a savings of at least 25% on IT costs[2]. By partnering companies can benefit from utilization of latest IT operations management technologies, and leverage automation to improve efficiency and reduce costs.

IT Service Management in Telecom Companies

Evolving IT Services – Driving Business

(Source - KPMG)

IT Services are designed and implemented to meet business challenges and to bridge the gap between capability and achievability of the business requirement. With the growing business expectations from IT Services, IT is transitioning from a support function to business function.

ITSM helps organisations to mature IT to the level of IT Governance which is aligned with the Corporate Governance structure of the organisation. To satisfy the growing expectations, it is vital to have an effective framework for managing IT services.

What is IT Service Management (ITSM) - IT Service Management is a discipline for managing IT Systems and Services to satisfy customer's requirements of IT's contribution to the business. It helps organisations to manage end-to-end IT services providing roadmap for transformation of IT into a strategic partner to the business.

Adopting ITSM framework and aligning it to the organisation's business environment provides huge potential benefits that include:

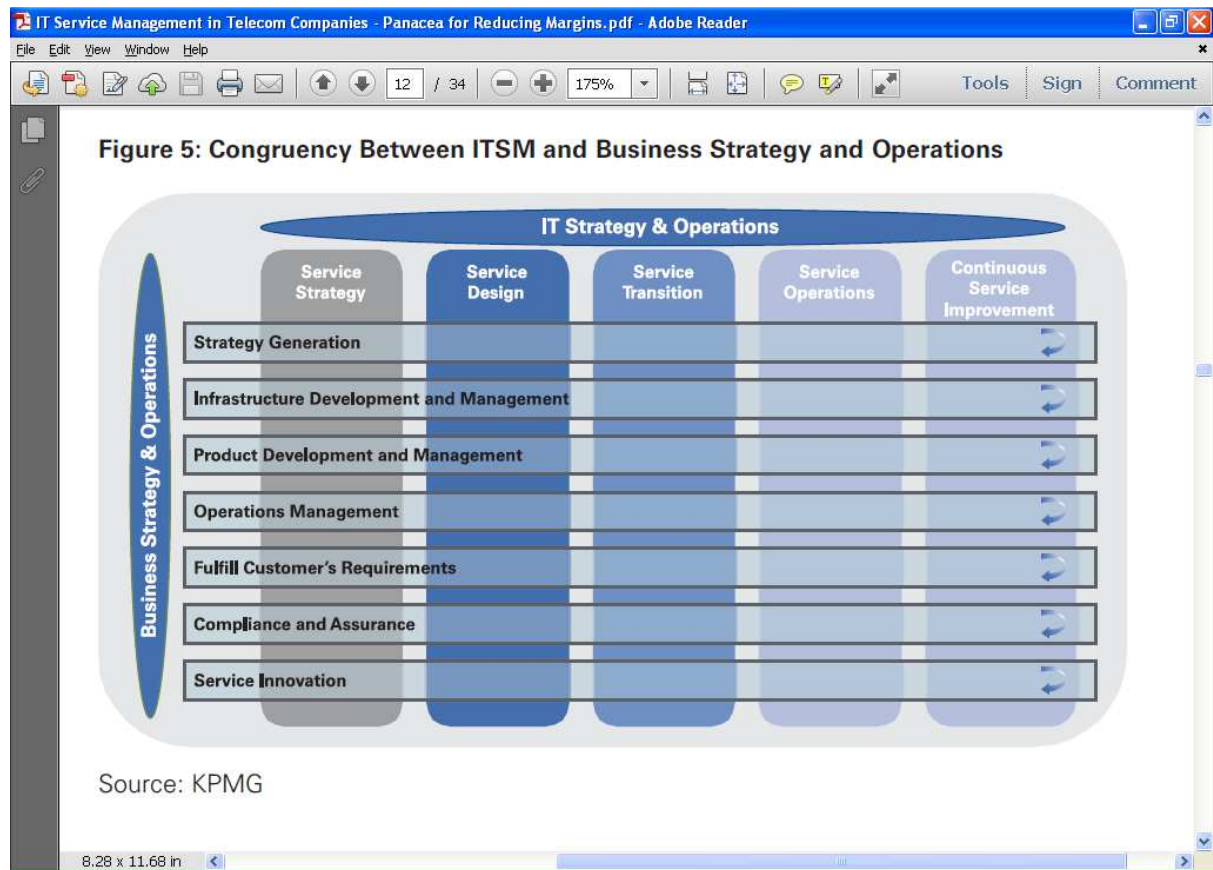
- Reduced operating costs
- Improved quality of IT Services
- Improved customer satisfaction
- Improved productivity
- Improved management and monitoring of third party services
- Improved compliance to legal and regulatory requirements
- Integration of business strategy with IT service strategy
- Improved implementation and management of IT services for dynamic, high risk, volatile and rapidly changing business needs.

An effective IT Service Management revolves around the core practices of Service Lifecycle Management which include:

- **Service Strategy** – focuses on the identification of market opportunities for which services could be developed in order to meet a requirement on the part of internal or external customers
- **Service Design** – focuses on the activities that take place in order to develop the strategy into a design document which addresses all aspects of the proposed service, as well as the processes intended to support it
- **Service Transition** – focuses on the implementation of the output of the service design activities and the creation of a production service or modification of an existing service
- **Service Operations** – focuses on the activities required to operate the services and maintain their functionality as defined in the Service Level Agreements with the customers and
- **Continuous Service Improvement** – focuses on the ability to deliver continual improvement to the quality of the services that the IT organisation delivers to the business.

An ITSM framework needs to be defined in accordance with the business requirements and operational drivers of the organisation to exploit the potential benefits of ITSM to the fullest. The diagram below depicts the congruency between ITSM and Business Strategy and Operations.

Figure 5: Congruency between ITSM and Business Strategy and Operations



The Ten Commandments of ITSM

IT Service Management is a strategy for managing the IT infrastructure through a customer focused, service driven methodology, enabled and supported by leading practice-based IT disciplines.

A primary focus of ITSM is to enable IT to be a more effective service provider across the enterprise. Although managing technology itself is critical, it is not necessarily the primary focus within an ITSM framework. ITSM addresses the need to align the delivery of IT services closely with the needs of the business.

The 10 Commandments of ITSM, which can help telecom companies to meet their challenges and to align IT Operations and Strategy with the changing business requirements, are defined as follows.

Service Strategy

1. Thou shall innovate and plan to outpace competitors and meet demands – Strategy and Demand Management is a process to understand and influence the demand for services and to define, develop and market these services to satisfy the demand

2. Thou shall plan and monitor expenses – IT Financial Management is a process of defining and managing value of the IT Services being delivered along with their budgeting, accounting and charging requirements. It acts as one of the decision making processes for the development and delivery of IT Services

Service Design

3. Thou shall sustain what you are bestowed with and shall endeavor to grow – Service

Continuity and Capacity Management is a process to manage the capacity and performance of the IT Services being delivered to pre-determined and agreed level and to help ensure service continuity at a level to support minimum business requirements following an interruption to the business

4. Thou shall collaborate to nullify ones incompetence – Supplier/Partner Relationship Management is a process to help ensure that suppliers/partners and the IT services they provide are managed to support agreed service levels and business expectations

5. Thou shall secure what others entrust to you – Information Security Management is a process to secure business information and help ensure that it is effectively managed in all services and service management activities

Service Transition

6. Thou shall strive to adapt to changes – Service Change and Configuration Management is a process to help ensure that changes to any IT Service and / or IT Asset used for providing IT Services are recorded, evaluated, authorized, prioritized, planned, tested, implemented, documented and reviewed in a controlled manner to help ensure its integrity across service lifecycle

7. Thou shall share and develop knowledge with the stakeholders – Knowledge Management is a process to help ensure that the right person has the right knowledge, at the right time to deliver and support the services required by the business Service Operations

8. Thou shall hasten to resolve all queries and troubles – Incident and Problem Management is a process to restore normal services as quickly as possible and eliminate recurring incidents to minimize the adverse impact on the organisation

9. Thou shall improvise on thy operations continuously – Operations Management is a process for managing the IT operations required for delivering the agreed level of IT services to the business

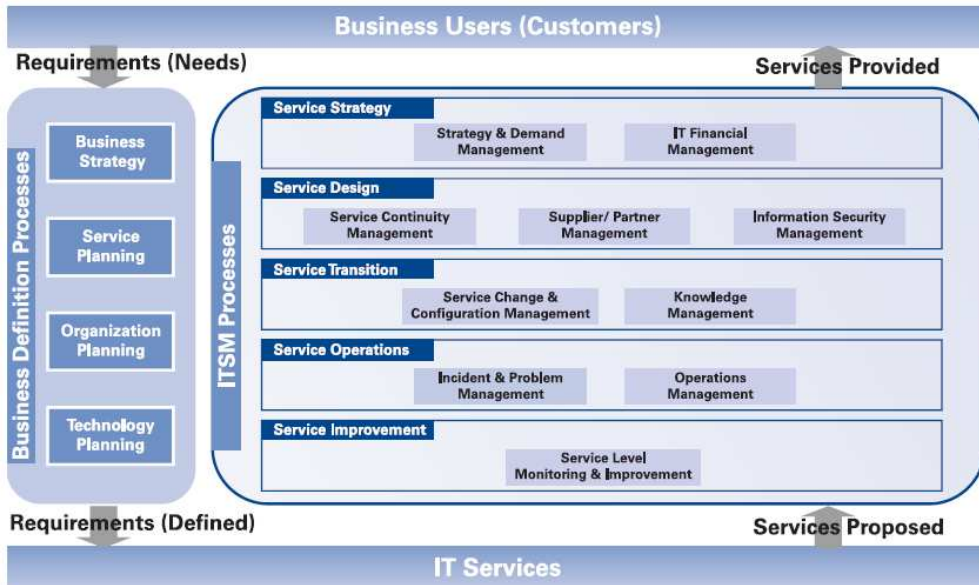
Continual Service Improvement

10. Thou shall watch what you are delivering and shall strive to improve service quality –

Service Level Monitoring and Improvement is a process to maintain and improve IT Service quality, through a constant cycle of agreeing, monitoring and reporting upon IT Service Levels.

An effective management of IT Service around these 10 commandments can help ensure the evolution of IT Services as Business Enabler to Business Driver.

Figure 6: ITSM Servicing Business Requirements



Source: KPMG

Q) "SPM is process oriented". Comment

https://en.wikipedia.org/wiki/Software_project_management

Software project management is the art and science of planning and leading **software** projects. It is a sub-discipline of **project management** in which **software** projects are planned, implemented, monitored and controlled.

Software Development Process

A software development process is concerned primarily with the production aspect of software development, as opposed to the technical aspect, such as software tools. These processes exist primarily for supporting the management of software development, and are generally skewed toward addressing business concerns. Many software development processes can be run in a similar way to general project management processes.

Examples are:

1) Interpersonal communication and conflict management and resolution Active, frequent and honest communication is the most important factor in increasing the likelihood of project success and mitigating problematic projects. The development team should seek end-user involvement and encourage user input in the development process. Not having users involved can lead to misinterpretation of requirements, insensitivity to changing customer needs, and unrealistic expectations on the part of the client. Software developers, users, project managers, customers and project sponsors need to communicate regularly and frequently. The information gained from these discussions allows the project team to analyze the strengths, weaknesses, opportunities and threats (SWOT) and to act on that information to benefit from opportunities and to minimize threats. Even bad news may be good if it is communicated relatively early, because problems can be mitigated if they are not discovered too late. For example, casual conversation with users, team members, and other stakeholders may often surface potential problems sooner than formal meetings. All communications need to be intellectually honest and authentic, and regular, frequent, high quality criticism of development work is necessary, as long as it is provided in a calm, respectful, constructive, non-accusatory, non-angry fashion. Frequent casual communications between developers and end-users, and between project managers and clients, are necessary to keep the project relevant, useful and effective for the end-users, and within the bounds of what can be completed. Effective interpersonal communication and conflict management and resolution are the key to software project management. No methodology or process improvement strategy can overcome serious problems in communication or mismanagement of interpersonal conflict. Moreover, outcomes associated with such methodologies and process improvement strategies are enhanced with better communication. The communication must focus on whether the team understands the project charter and whether the team is making progress towards that goal. End-users, software developers and project managers must frequently ask the elementary, simple questions that help identify problems before they fester into near-disasters. While end-user participation, effective communication and teamwork are not sufficient, they are necessary to ensure a good outcome, and their absence will almost surely lead to a bad outcome.

2) Risk management

Risk management is the process of measuring or assessing risk and then developing strategies to manage the risk. In general, the strategies employed include transferring the risk to another party, avoiding the risk, reducing the negative effect of the risk, and accepting some or all of the consequences of a particular risk. Risk management in software project management begins with the business case for starting the project,

which includes a cost-benefit analysis as well as a list of fallback options for project failure, called a contingency plan.

A subset of risk management is

a) Opportunity Management, which means the same thing, except that the potential risk outcome will have a positive, rather than a negative impact. Though theoretically handled in the same way, using the term "opportunity" rather than the somewhat negative term "risk" helps to keep a team focused on possible positive outcomes of any given risk register in their projects, such as spin-off projects, windfalls, and free extra resources.

3) Requirements management

Requirements management is the process of identifying, eliciting, documenting, analyzing, tracing, prioritizing and agreeing on requirements and then controlling change and communicating to relevant stakeholders. New or altered computer system[1] Requirements management, which includes Requirements analysis, is an important part of the software engineering process; whereby business analysts or software developers identify the needs or requirements of a client; having identified these requirements they are then in a position to design a solution.

Change management is the process of identifying, documenting, analyzing, prioritizing and agreeing on changes to scope (project management) and then controlling changes and communicating to relevant stakeholders. Change impact analysis of new or altered scope, which includes Requirements analysis at the change level, is an important part of the software engineering process; whereby business analysts or software developers identify the altered needs or requirements of a client; having identified these requirements they are then in a position to re-design or modify a solution. Theoretically, each change can impact the timeline and budget of a software project, and therefore by definition must include risk-benefit analysis before approval.

4) Software configuration management

is the process of identifying, and documenting the scope itself, which is the software product underway, including all sub-products and changes and enabling communication of these to relevant stakeholders. In general, the processes employed include version control, naming convention (programming), and software archival agreements.

5) Release management is the process of identifying, documenting, prioritizing and agreeing on releases of software and then controlling the release schedule and communicating to relevant stakeholders. Most software projects have access to three software environments to which software can be released; Development, Test, and Production. In very large projects, where distributed teams need to integrate their work before releasing to users, there will often be more environments for testing, called unit testing, system testing, or integration testing, before release to User acceptance testing (UAT).

A subset of release management that is gaining attention is Data Management, as obviously the users can only test based on data that they know, and "real" data is only in the software environment called "production". In order to test their work, programmers must therefore also often create "dummy data" or "data stubs". Traditionally, older versions of a production system were once used for this purpose, but as companies rely more and more on outside contributors for software development, company data may not be released to development teams. In complex environments, datasets may be created that are then migrated across test environments according to a test release schedule, much like the overall software release schedule.

Q) “Virtual Project Management”

http://www.umsl.edu/~sauterv/analysis/488_f01_papers/rolfes.htm

https://en.wikipedia.org/wiki/Virtual_team

Abstract

The rise of the Internet and development of collaborative software have instilled a new dimension into project management. This paper explores recent literature that evaluates virtual project management and virtual teams to determine the extent new technologies affect projects with members in dispersed locations. It is found that the new channels of communication offer opportunities for participation, but it is still more difficult to manage a virtual team than an on-site team.

Introduction

Every college graduate preparing for the rash of interviews during senior year reflects on the proper answer to the question “Are you a team player?” The business literature at the end of the 20th century excuses the concept of a Lone Ranger in favor of bringing together employees who can collaborate with others to bring forth synergy greater than individuals working on their own agenda. The resulting boon in research, studies, and articles on team interaction could fill many shelves in a library.

Now factor in global organizations with talent spread among many time zones and dispersed through various nations. Companies send their best and brightest overseas to effectively colonize new worlds, bringing products and services to win over the natives, thereby growing new revenue in expanding markets. However, these locations were often merely islands with little interaction with other locations since interaction was limited to phone, fax, mail, or personal visits.

The final ingredient is the World Wide Web. Enter cost effective email, broadband, along with collaborative technologies and the concept of virtual teams emerges with all the hype associated with other Internet breakthroughs. Some authors point to other factors contributing the emergence of virtual teams. Franklin Becker of Cornell University adds that “people are doing significant parts of their work in different places.” He asserts mobility is transforming the office place, thus making the use of new communication technologies a necessity. [1] UCLA professor Phil Agre asserts that the trend feeds upon itself “people talk to each other, a lot, routinely, across distances, by several media.” [2] However, even with improved communications, virtual project management is an uphill climb.

Definition: Identifying Virtual Teams

Virtual project management is the system by which virtual teams collaborate for a finite period of time towards a specific goal. There are several appealing definitions in the literature.

Peterson & Stohr identify virtual teams (a.k.a. Geographically Dispersed Team) as a “group of individuals who work across time, space and organizational boundaries with links strengthened by webs of communication technology. They have complementary skills and are committed to a common purpose, have interdependent performance goals, and share an approach to work for which they hold themselves mutually accountable.” [3] A brief, but similar definition is proposed by Krill & Juell: “A virtual project is a collaborative effort towards a specific goal or accomplishment which is based on ‘collective yet remote’ performance.” [4]

Perhaps an appropriate approach is to view virtual projects and teams as simply projects and teams with a virtual overlay. This is a perspective taken by Cantu who proposes teams become virtual when any of three components are added to the mix: 1) different geography or locations of team members, 2) team members from different organizations or parts of the organization, or 3) different durations or lengths of time that member work together as a team. She suggests the concept runs across a spectrum as each component is expressed to a greater extent. [5]

Similarly, other authors have established dimensions of virtual teams. Fisher & Fisher propose time, space, and culture. [6] Lipnack & Stamps identify people, links, and purpose as the strongest characteristics that distinguish a virtual team from a traditional team (Virtual Teams: Reaching across space, time and organizations with technology) [7]. On the other hand Skyrme believes the dimensions of virtuality are time, space and structure. [8] Three dimensions are also popular with Kimble, Li & Barlow who like time, place and organization. [9]

Another approach to the subject is to divide teams into subtypes and distinguish "virtualness" as a characteristic. Guss states that there are four classes of team:

Pure: team functions virtually, without control of any one organizational method

Transitional: the team functions as a combination of hybrid and mono forms, and then the other

Hybrid: the team functions in a multi-organizational culture

The team members all function in same organization [10]

One gets the feeling that everything old is new again with the Internet. Perhaps there is truth in this statement, but recent technology has greatly enhanced the possibility of geographically dispersed employees working together on common projects. This thread of thought is weaved into related areas, such as corporate structure with virtual companies and virtual enterprises. Some concepts are taken from the older topic of telecommuting. Still others from CASE tools that allow collaborative engineering. Most of the concepts from these ideas are shared, as is the literature.

Virtual Teams in an Organizational System

Rather than just a mere curiosity, promoters of virtual teams assert there are many advantages to virtual teams. A few of the drivers leading to interest in virtual teams include attracting the best workers independent of location, no need to relocate existing workers, flexibility, reduction in travel time and expense, environments requiring inter-organizational cooperation, shift towards service work, global workdays (24 hours vs. 8), and changes in workers expectations. Although not the answer to all logistical problems encounter by projects, it does provide a potential solution to numerous personnel and work issues.

Whether from necessity or deliberate design, companies are relying on new communicative technology with an impact on organizational structure. Cooper, for instance, takes a loose view of Systems Thinking and uses it as a framework in which to place teamwork. Her emphasis is on change, and the changes relevant to contemporary organizations are reengineering, system integration, process redesign, Total Quality Management, and teamwork. These have been well promoted over the past decade and require a transition away from traditional approaches of management that emphasize the analysis of individual problems and incremental change. Systems thinking is constant change. Teamwork is unique because it overlaps all these radical transformations. It is key to the success of these changes that each employee see their niche in the total environment. [11]

Network organizations are a popular subject because of their novelty and interplay with new telecommunication technologies. Therefore, it is not uncommon to read about virtual teams in the same context of virtual organizations. Obviously, by definition, any team of a virtual organization is a virtual team. Typically, virtual organizations are discussed in terms of a network and the network model is imposed on the team structure as well. The appealing line of the network model is that it focuses on links and nodes. Since the links are the distinguishing factor that define virtual teams apart from traditional teams, examining links and nodes on a more microcosmic level may bring forth some enlightenment on the interaction between the individual members (nodes) and the types of links developed by successful virtual teams.

Sandhoff emphasizes real interactive structures in her analysis of organizations. She says, "From the perspective of those involved in it, a network presents itself as a loose, indirect and confusing structure of relations which is nevertheless able to influence social events." [12] This initial outlay yields the conclusion that successful network organizations are built on trustful relationships. It is the social network that reduces uncertainty and increases performance by providing a sense of predictability and allowing the exchange of resources.

Lipnack and Stamps also approach virtual teams through the portal of network systems. They predict 21st century organizations will be network organizations with virtual team components and each team networked with others. The key change will be the elimination of one-way paths within teams and organizations since teams function best through two-way communication structures ("Virtual Teams: The new way to work"). [13]

However, imposing the network on virtual teams may be limiting since few companies actually subscribe to network structures over traditional structures. Therefore, Peterson and Stohr list seven basic types of virtual teams.

Networked teams consisting of individuals who collaborate to achieve a common goal; membership is diffuse and fluid

Parallel teams: work in short term to develop recommendations for an improvement in a process; has a distinct membership

Project Teams: conduct projects for users for a defined period; tasks are non-routine and results measurable; team has decision making authority

Production Teams: perform regular work, usually in one function; clearly defined membership

Service Teams: support customers in typical service support role around the clock

Management Teams: work collaboratively on a daily basis within a functional division

Action Teams: offer immediate responsiveness, activated in emergencies [14]

Although not disputed, most of the literature focuses on network teams or project teams either explicitly or implicitly. Research on the remaining areas is undeveloped or relevant characteristics gleaned from general works. The rest of this paper will focus exclusively on virtual project management teams.

Steps of Virtual Projects

There are numerous takes on what are the appropriate steps to project management. Instead of discussing these at length, it would be best to pick a general model and develop the permutations that those writing within the subject of virtual teams choose to emphasize. Gray & Larson support a traditional, linear model of collaboration involving

- 1) partner selection,
- 2) project manager team building,

- 3) stakeholder team building,
- 4) project implementation, and
- 5) project completion – celebrating success. [15]

The first step listed is picking the right people. This is not really true since the project needs to be identified, promoted and approved by someone. This is generally not addressed since it is often not a distinguishing factor of virtual teams. Choosing personnel is the first step where traditional and virtual project management diverge.

One of the motivations of instituting a virtual team is that location is no longer a barrier to potential participant. However, one must consider the requirements of team membership and who makes the grade. Here much of the literature borrows from previous writings on telecommuting. Schilling asserts there are a variety of criteria. First of all, participation must be voluntary--teams are destined to fail if not supported by its members. Furthermore, members must have previously demonstrated satisfactory work responsibilities and habits. Schilling further identifies a number of key social characteristics since work is often performed alone. The employee must be able to perform with limited supervision and feedback, reduced social interaction, have good organizational and time management skills, be self-motivated, demonstrate good performance, and be able to concentrate if away from a worksite. [16]

Putman, an author who also borrows heavily from telecommuting, believes that tasks involving “transmitting clearly defined pieces of information” are the best candidates for independent workers. However, this is typically not the situation in project management, which is oriented towards problem solving. Here she notes that collaborating workers developing new products require intense forms of communication that distinguish telecommuters from virtual team members. [17]

It should be noted that the number of participants should be limited to a few. Lipnack & Stamps suggest five to ten (“Dispersed Teams are the Peopleware for the 21st Century”). [18] This is reasonable considering the network structure previously discussed. With each additional member added to the team, the number of links increases. Even with the best technology communication along those links are slow, making collaboration more difficult than face-to-face teams.

The next step in the Gray & Larson model is to develop the leader. Discussion on this topic is reserved for the section on “Leadership” because virtual teams impose unique demands on the project manager from start to finish.

The team needs to be developed and prepared for the task at hand. One method is the nine step Xerox model described by Fisher & Fisher. The first step is to form the team, but all the remaining steps are to prepare the members for their tasks. Steps two through nine are 2) communicate the vision, 3) develop a mission statement 4) define goals, 5) develop norms, 6) develop roles, 7) develop meeting processes, 8) develop communication processes, and 9) develop work processes. [19] The Xerox model is a sound model, but does not distinguish virtual teams from traditional ones in enumerating steps. This is not incorrect, but the implementation of the steps will require different practices and areas of emphasis for virtual teams.

Cantu identifies organizational design, job design, and team design as important early elements. Within organizational design, business goals are defined in the context members operate; members need to recognize the team values of others; the team needs to develop an infrastructure for involvement; and they need to design the configuration of

the team while setting boundaries. Members need to be clearly aware of the team's expectations of how each will participate. Therefore, up-front job design should consist of defining realistic job previews; designing accountability; giving decision making power to the team; discussing compensation; and providing feedback for employee development and recognition. Finally the team needs to be clearly defined as well. The team should have a clear identity, create a statement of purpose, name goals, and make connections with those outside the team who can provide resources and support. [20]

The fourth step, project implementation, proceeds like most other projects. The steps here are likely to be highly correlated with the subject of the project. For instance, if the project was to create a software package, appropriate development steps should be taken whether the team is virtual or traditional. However, virtual teams face additional challenges, describe in further detail in the section titled "Obstacles", and require more effort to keep open the lines of communication and develop trust.

The final step in the Gray and Larson Model is project completion. Many sources suggest a form of celebration to mark the completion of the task and recognize the members of the team. For traditional teams this may mean going to dinner as a group. A virtual team may decide to do the same, but there are alternatives as well. A final video conference with corporate tokens of appreciation could be a substitute.

Some authors observe that there are other considerations upon completion of a project. Cantu labels this as re-entry. Members need to transition into new job roles or reallocate time that they previously dedicated to the project. [21] There is also the concern that their effort participating in the project be visible to those around them, particularly their supervisors. A good virtual team manager addresses these issues prior to kickoff.

Obstacles

All project teams face obstacles to success. When one decomposes virtual teams into the summary of its parts, it is evident that virtual teams are especially challenging. Lipnack and Stamps note that "All the pitfalls that can trip up a collocated team are dangers to a virtual team, but even more so... [T]he best summary we've seen [are] 'team killers'. They include: false consensus, unresolved overt conflict, underground conflict, closure avoidance, calcified team meetings, uneven participation, lack of accountability, and forgetting the customer." These can be a part of every team. However, virtual teams add a new dimension to the problem—"technology adoration". The authors suggest some people think that virtual team problems can be solved by setting up e-mail list, opening chat rooms, and mounting desktop conferencing. These can certainly help teams, but only when used in conjunction with the overall strategy of the project. ("Dispersed Teams Are the Peopeware for the 21st Century") [22]

Lipnack and Stamps only cover one aspect of the unique difficulties encountered by virtual teams. There is more than just technology nerds running amuck. Kimble, Li, and Barlow suggest that virtual teams face "barriers" which can be either technological or non-technological. Technological barriers would include such inconveniences as slow network computers, poor architecture, and lack of collaborative software. They also note that most equipment and software has been designed for use in a conventional office, so those working at remote sites may face problems interfacing with their team. Although some technological problems can be inhibiting, the authors considered other barriers to be more serious. Chief among these would be organizational and cultural barriers. Also included in the list are perceived disruption of virtual teams to corporate culture and the loss of employee's loyalty. [23]

The bulk of the literature does not directly define the “barriers” or “team killers”. Virtual teams face problems encountered by all teams, people working with others in the organization, plus those face by the virtual nature. These can be numerous. In the end it simply boils down to the fact that it is difficult to collaborate on something when the communication process is inhibited. New technologies just provide new mechanism to make distant collaborative teams possible, not necessarily superior to other options. Since virtual teams present stiff challenges to its members, most authors end up heavily emphasizing one of three areas: building trust, enhancing communication, and developing virtual management skills.

Building Trust

In an ordinary project trust is built through frequent interaction. If the members of the project team are located on the same site, they may already know each other and have the advantage of previous interaction with their colleagues. Members can see one another working on the project, discuss issues at the water cooler, and build a relationship with daily interaction. A distance project team may have none of these advantages. For this reason the majority of the “How to” literature encourages deliberate activities that build trust. Typically the major recommendation across these works is to provide a face-to-face kickoff meeting for all members to get to know each other.

Kiser states that “Trust is the grease. Without it, you’re not going anywhere.” Members have to trust that others are doing their work, and doing it at a high quality level while meeting deadlines. Furthermore, language and culture differences can become a factor. Many times emails can be interpreted in different ways, something that might be cleared up in a face-to-face meeting or visual cues regarding the other’s reaction. [24] Xerox, for instance, encourages imbedding pictures of team members into collaborative and communicative technologies in order to “see” the other member (Fisher & Fisher). [25]

In a research study Herzog interviewed 20 participants from IT projects and concluded that the major factors influencing the level of trust were the members’ perceptions of self, of others, and of the process and activities. [26] This expands the notion of trust beyond most authors’ considerations, who only emphasize relationship-building between team members. The implication of Herzog’s research is that activities must take place that also emphasize buy-in to the project’s goals by building the member’s reasonable expectations. Also, the foundation of trust starts off in square one by selecting people with the right personalities and approach to their work. In a similar vein, Fisher and Fisher go one step further and state that corporations encourage trust through their approach to business. Companies that are honest, establish strong business ethics, do what they say, and grant trust provide a healthy environment for trust to flourish. [27]

Communication

Communication builds trust. It provides guidance, and the phrase “collaborative teams” infers that communication is taking place. Lack of communication is the one hurdle that really distinguishes the challenges faced by virtual teams. Blaine and Bowen build on Daft and Wiginton proposition that it is not quantity of information that reduces equivocally, but the quality or “richness” of that information. Richness is a property of the medium used to convey information, which includes the mediums’ ability to provide immediate feedback, use multiple cues and channels, and allow personalization and language variety. Communication can be decomposed into its data capacity and richness. A phone, for instance would be high in richness, but low in data capacity, while reports would be high in data capacity, but low in richness. [28] Recent technologies have simply provided additional mechanisms of communication. With each new tool in the toolbox, there is a

chance that a more appropriate tool exists for the communication need than existed a decade ago.

The effects of various types of communication mechanisms was the subject of a study by Eggert. He approached the topic through the framework of a dilemma game, also called the prisoners' dilemma, public good games, or free riding game. The concept is that with collaboration two individuals achieve a better payoff, but must rely on the other person to get that better payoff. There is also an incentive to cheat or free ride where there is gain by one member at the other's expense. They conducted seven free riding experiments where the difference between each was the type of communication related to business interfaces. These included communication by reference, identification, lecture, talk-show, audio-conference, video-conference, and table conference. Eggert evaluated the cooperation level and the stability of the cooperation for each method. He found reference and identification produced low levels of cooperation and were highly stable. Lecture, talk show and audio-conference produced intermediate levels of cooperation that were unstable. Finally, video and table conferencing produced a high level of cooperation and were highly stable as well. He concludes the business implication is that both auditory and visual communication play key roles for efficient outcomes. [29]

Certainly video and face-to-face conferencing is not always possible with all virtual team communications. Therefore, several authors have provided guidelines for alleviating communication problems. Gould suggests the following practices

Including face-to face when possible, give team members a sense of how the overall project is going by providing schedules

Establish a code of conduct to avoid delays (i.e. acknowledging email)

Don't let team members vanish (i.e. use calendars)

Augment text-only communications with charts, pictures and diagrams

Develop trust [30]

Peterson and Stohr also have four tips for effective distance communication:

Standards for availability and acknowledgement

Team members replace lost context in their communication

Members regularly use synchronous communication

Senders take responsibility for prioritizing their communication [31]

Other practical suggestions include establishing a communication center with a project web site. This ensures that everyone is working from the same documents and have the latest information on the team's progress (Barker). [32] Feldman concurs with this idea and adds that putting a project on the Internet can help build an audit trail to record the documents and details. [33]

The Virtual Team Project Manager

Leading a virtual team not only involves the communication complexities, but requires a certain shift in the project leadership approach. Fisher & Fisher assert that the project leader now must manage the boundaries—the environment that surrounds the team. A few of these include introducing members to key external contacts, building systems for data linking, and intermediating with headquarters. The authors assert this is different from traditional project managers who work in the system rather than on the system. They place virtual project management into seven clusters: leader, results catalyst, facilitator, barrier burster, business analyzer, coach, and living example. [34]

Benett examined project management activities and broke down activities into tasks, resources, and tracking. Establishing tasks and acquiring resources are areas project managers already have experience with, although virtual project management adds a

new twist. [35] Tracking, on the other hand, requires a new paradigm of managing people and progress of the project. Pearlson suggests project managers venturing into the virtual world for the first time are faced with three paradoxes: 1) an increase on structure and flexibility—flexibility in the sense of the work environment and structure as it relates to the pattern of interaction. 2) Greater individuality and more teamwork—individual effort is needed due to the distance, but there needs to be unity and commitment by the team members on objectives. 3) An increase and decrease in control—control over the worker is reduced, but managers must maintain strong control over the structure of the group. [36]

Davies adds to the discussion by considering appraisal and compensation. First he considers whether appraisals should be based on similar terms as members of traditional teams. The conclusion is no. The activities of a virtual team required for success are disguisable from the traditional approach. Therefore, the skills (communication for instance) shift. Although he does not draw any hard conclusions, he urges examining what is needed for the effective outcomes of the virtual project and back out the appropriate evaluation factors from those. [37]

Software exists that can aid in the evaluation of team members. One avenue is monitoring software, but this erodes the concept of trust. Yogesh Malhotra, the CEO of Brint.com, cautions against using such software. “One may compare the above description with bringing up a teenager by the parent. One could either use the technology... for continuously monitoring each movement of the child, or one may rely more on the sharing of family values.” He recommends keeping the channels of communication open and promoting a culture characterized by “clan control”. (“Virtual Corporations, Human Issues & Information Technology”) [38]

The new world of virtual project management requires many of the same skills as traditional project management. However, it means letting go of some of the control, which may be difficult. It is impossible to micromanage a virtual project. Coordination skills are primary because of the reduced communication of virtual teams

Conclusion: The Elements for Success

At this point it would be worthwhile to take a moment and reflect on the words “virtual project team”. Taking these in reverse order, team is the most basic concept. A project leader should question, what makes up a good team? Appropriate answers would be qualified individuals; commitment of members; and communication among players. These are simply the foundation of any group activity. Narrowing the focus a little further, what makes a successful project given a good team? Appropriate answers would be clearly defined goals, access to resources, and a supportive environment. Finally, factor in the virtual qualifier. How does this change what is required of the team and the project. The answer here is that it changes none of the requirements. It does, however, make the requirements more difficult to arrive at because of reduced communication channels. The technologies made available in the past five years merely add broadband to once narrow channels. This broadband not only increases the amount of data that can be transferred, but improves the richness of communication.

Manheim & Medina propose that virtual behaviors are influenced by 1) the nature of the work, 2) management of critical supporting work processes, 3) organizational context 4) geographical context, 5) communications support, 6) other environmental contextual factors, and 7) individual characteristics. [39] Lipnack and Stamps more simply state that “[T]he best collocated teams use principles incorporated by the most successful virtual

teams: a clear purpose, a focus on people, and concentration on the links that connect them.” (“Dispersed Teams Are the Peopleware for the 21st Century”). [40]

In the end, a successful virtual project team is successful because they emphasized the necessary components of project teams. The introduction of the virtual world may be beneficial because it demands that the leader and players take a step back and ask themselves, “with this new twist on project teams, what is required of my group and me?” It requires an absolute commitment to project management methodologies. Virtual project teams are successful because the leaders and members put forth the extra effort to overcome communication barriers.

As per wikipedia

Advantages

Cultural diversity has been shown to have an impact on group decision-making, and some of it can be positive for the team.[92] Combined with collaborative conflict management, groups of individuals from different cultural perspectives are more likely to actively participate in group decision making.[93] The differing backgrounds and experiences of these group members also encourage creativity and create conflicting viewpoints, which make it more likely that multiple options are explored and considered. The other side of this same coin is that virtual teams create a more equal workplace, discouraging age, race, and disability discrimination by forcing individuals to interact with others whose differences challenge their assumptions. Physically disadvantaged employees are also able to participate more in teams where communication is virtual, where they may not have previously been able to due to physical limitations of an office or other workspace.[94]

Virtual teams are required to use technologies to communicate that have the side effect of mitigating some negative impacts of cultural diversity.[92] For instance, email as a medium of communication does not transfer accents and carries fewer noticeable verbal language differences than voice communication. Cultural barriers are not removed from the team, they are instead shielded from view in situations where they are irrelevant. In fact, simply understanding the diversity within a team and working on ways around that can strengthen the relationship between team members of different cultures.[95]

Virtual teams save travel time and cost, significant expenses for businesses with multiple locations or having clients located in multiple places. They also reduce disruption in the normal workday by not requiring an individual to physically leave their workspace.[94] This improved efficiency can also directly translate to saved costs for a company.

A company is able to recruit from a larger pool of employees if using virtual teams, as people are increasingly unwilling to relocate for new jobs. A growing amount of talent would otherwise be unobtainable without the employee traveling often. The use of virtual teams also allows the employee to participate in multiple projects within the company that are located on different sites.[94] This in turn helps the company by allowing them to reuse existing resources so that they are not required to hire a new employee to do the same job.

Disadvantages

It is common that cultural differences will come up in global teams. Cultural diversity also has negative impact on communication, often due to language barriers and cultural mismatches in the workplace.[92]

Satisfaction among the team members of a virtual team has been shown to be less positive than satisfaction among face-to-face teams. This drop in satisfaction is in part because it is more difficult to build trust without face-to-face communications,[96] a necessary part of high-performing virtual teams.[97] However, effective management and adherence to proper goal setting principles specific to the nature of work virtual teams require can lead to improved team effectiveness.[96] If a team and its corresponding management is not prepared for the challenges of a virtual team, this will be difficult to achieve.

Transactive memory rarely exists in virtual teams, and even when it does it is often not transferred to new members and contextual knowledge is not kept or well documented.[98] Development of this type of common ground is particularly difficult on virtual teams due to the indirect methods and low frequency of communication. While teams that meet in person can develop this naturally, virtual teams will often have to create it artificially and ahead of time.[96]

Virtual teams also highlight a generational gap, as may older executive and senior managers will not have as much experience with computer technology as their younger counterparts.[94][99] These senior members must then make an extra effort to catch up to the younger generation and understand this new way of communicating.

Another problem unique to virtual teams is that of differing time zones. A part of the team on one side of the world may be asleep during another part's normal workday, and the group has to work around this. Asynchronous communication tends to be more difficult to manage and requires much greater coordination than synchronous communication.[93][94]

Team leaders will need more training, specifically in delegation. Given that, team members need to be able to share leadership responsibilities and training programs ought to be developed in recognition and support of that.[100] A contribution to this problem is that few companies have extensive expertise in how to operate and engage in virtual teams, and they create them without understanding how they differ from regular teams

Difficulties of Common Ground in Virtual Teams

Despite the improvement in telecommunication to overcome distance as an obstacle for collaboration, working in separate locations still increases the odds that people are not on common ground, and are not aware of it. Common ground, i.e. mutual knowledge, is an important element to successful communication and coordinated activity. Working separately, through technology makes it more difficult to detect and resolve misunderstandings from a lack of common ground.[101]

Technology and Common Ground in Virtual Teams

Technologies such as video with higher media richness can provide more context for common ground and are proven to be more effective in negotiation. It is important to consider the frequency of negotiations in our everyday conversations. Negotiation of meaning happens regularly especially for people of different backgrounds and cultures. Throughout all the smaller negotiations made between two actors in order to achieve common ground, it can be seen that higher media richness does in fact improve common ground. The cost and difficulties of video and other high media rich technology, and further show the disadvantages of a virtual to a collocated team.[102]

Failures to communicate and remember information about context

When it comes to distance, the need to communicate and remember differences in context often escapes the collaborators. Collaborators often assume their remote partners

are in the same context, or forget that the remote partners are not, and hence fail to remember communicate about an essential contextual information to their remote partners. For instance, there have been many recorded cases of workers going offline because of a public holiday in their country, but forget that the other party they are working with in a different area does not have the same public holiday, and hence fail to communicate about the holiday.[101] This failure to communicate contextual information will inevitably cause a misunderstanding and cause people to jump to conclusions and mistrust each other. Other problems include poor decision quality[103] and wasted time needed to correct the lack of mutual knowledge.[104] Additionally, even if contextual information has been communicated, collaborators may still forget about it. This means that conclusions are again drawn with the lack of essential contextual information, causing misunderstanding. For instance, a team member may communicate to her team that she has an upcoming trip and will not be able to communicate within that time period. However, the team forgot about it and still sent her e-mail requests for immediate action while she was away.[101]

Uneven distribution of information

When digital technology is used to replace face-to-face communication, it is difficult to detect the actual messages that have been both sent and received by a receiver and vice versa. For instance, if collaborators have two email addresses, a primary and a secondary one, some messages may be sent by the server to the primary addresses and some the secondary addresses. If both partners only read messages received in the primary addresses, then a lot of information would be lost in transmission and the working partners would be on very different grounds. These working partners would be both wondering why are some messages ignored while others are received and incorrect conclusions would be drawn leading to misunderstandings. Since both partners are unaware of the root cause of their misunderstandings, it would be a long time before this problem is brought to light and by then a lot of tensions and conclusions would have been drawn by then. Errors in the distribution of messages are more common in technology than face-to-face interaction leading, to the lack of common ground.[101]

Differences in what information is salient

When it comes to face-to-face interaction, the speaker may make the importance of a message known through tone of voice, facial expression and bodily gestures. The receiver may acknowledge understanding through exact feedback called “back-channel” communication, such as head nods, brief verbalization like “yeah” and “okay” or smiles. These methods of emphasis and feedback ensure parties are on common ground. However, these same methods are absent or scarce in most digital means of communication. For example, in an e-mail exchange, it is easy to overlook the important point of the message as intended by the sender. The receiver may interpret the message differently, giving different parts of the message different priority. In the worse case, this may cause lack of action to the salient parts of the message by the receiver’s part. Fully implementing “back-channel” communication is time-consuming. The lack of convenient cues in digital communication makes dispersed collaboration less conducive for the establishment of mutual knowledge.[101]

Differences in speed and timing

Speed and timing of communication is inevitably not as uniformed in digital communication than face-to-face interaction. This is due to the fact that some parties would have more restricted access to communication than others. The differences in relative speed and timing of feedback are aggravated by differences in time zones. In some cases, the problems arising from differences relative speed may be attributed instead to a lack of conscientiousness on the part of the slower partners. In fact, a

fluctuating feedback cycle is more destructive than a uniformed feedback cycle of a slower pace.[101]

Uncertainty about the meaning of silence

Messages met with silence can mean a variety of things. For example, silence can be due to technical problems within the technology that mediates the parties involved in communication, or it can be due to the fact that one of the partners is out of town and cannot reply the message. Whatever the reason, silence is a barrier to establishing common ground, firstly because of the ambiguity of silence. Silence is so ambiguous, it can be interpreted by the receiving partner in so many ways. For example, it can be taken to mean agreement, disagreement, and indifference or in the case of dispersed group – the message was undelivered. Secondly, silence blurs the notion of what is known and unknown in the group, signaling the absence of common ground.[101]

Q.) What Is the Role of IT Department

A.) From Sudhanshu Sir's Doc.

Statement: IT department drives

- (a) IT Infrastructure
 - IT Hardware
 - IT Software

15. Then the Prof asked the class to list out all IT functions in an organisation and organise them under suitable logical subheads. Following is the list that emerged:-

| Sl | Functions | Components | Remarks |
|----|------------------------|---|--|
| 1. | IT Infrastructure mgmt | (a) Hardware | This Role will become obsolete |
| | | (b) Software | This Role will become obsolete |
| | | (c) Cloud (WebApps / External Cloud) | This will gain prominence |
| 2. | Security | (a) of Data | This Role will become obsolete |
| | | (b) of Network | This Role will become obsolete |
| | | (c) of Applications | This Role will become obsolete |
| 3. | Networks | (a) Inventory / Components | These Roles will become obsolete (as organisations will progress towards Mobile Virtual Network Organisations - MVN) |
| | | (b) Firewalls | |
| | | (c) Firmware (Hardware + Software) | |
| 4. | Data Magmt | (a) Warehousing | These are strategic activities and not operational activities. These will gain prominence |
| | | (b) Mining | |
| | | (c) Database | |
| | | (d) Master Data Mgmt (Vendor/ Articles) | |
| | | (e) Backup / Disaster Recovery | |
| | | (f) Metadata | |
| 5. | Automation | (a) of Processes | These will gain prominence |
| | | (b) Artificial Intelligence(AI) | |
| | | (c) Virtual Reality | |
| | | (d) IOT | |
| | | (e) Robotics | |
| | | (f) Telecom | |
| 6. | Compliance | (a) Policies | Big change will come here. These will gain prominence and create BRANDS! |
| | | (b) Standards | |
| 7. | Communication | (a) Video Conferencing | Will gain prominence and RUN THE BUSINESS!! |
| | | (b) Mailing | |
| | | (c) Device Management | |
| | | (d) Telecom | |
| 8. | Analytics | (a) OLTP | Fast gaining Prominence and will merge with the role of Data Management |
| | | (b) OLAP | |

| | | | |
|-----|------------------------------|------------------------------|--|
| | | | |
| 9. | Support and Maintenance | | Will have to and WILL BECOME VERY POWERFUL |
| | | | |
| 10. | R & D | Will gain greater importance | But will be performed at / will be the function of Universities/ Academic Centres (innovate/ progress/ invent) |
| | | | |
| 11. | Access & Identity Management | | ??????? |
| | | | |
| 12. | Software Development | (a) Design | Will stay for some time. ∅ of 15 yrs. Will get replaced by WebApps |
| | | (b) Development | |
| | | (c) Testing | |
| | | (d) Analysis | |
| | | | |
| 13. | Reporting | Business Intelligence | Will merge with Data Management |