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EDITORIAL PREFACE

This is second issue of volume three of the International Journal of Business Research and Management (IJBRM).The International Journal of Business Research and Management (IJBRM) invite papers with theoretical research/conceptual work or applied research/applications on topics related to research, practice, and teaching in all subject areas of Business, Management, Business research, Marketing, MIS-CIS, HRM, Business studies, Operations Management, Business Accounting, Economics, E-Business/E-Commerce, and related subjects. IJRBM is intended to be an outlet for theoretical and empirical research contributions for scholars and practitioners in the business field. Some important topics are business accounting, business model and strategy, e-commerce, collaborative commerce and net-enhancement, management systems and sustainable business and supply chain and demand chain management etc.

The initial efforts helped to shape the editorial policy and to sharpen the focus of the journal. Starting with volume 3, 2012, IJBRM appears in more focused issues. Besides normal publications, IJBRM intend to organized special issues on more focused topics. Each special issue will have a designated editor (editors) – either member of the editorial board or another recognized specialist in the respective field.

IJBRM establishes an effective communication channel between decision- and policy-makers in business, government agencies, and academic and research institutions to recognize the implementation of important role effective systems in organizations. IJBRM aims to be an outlet for creative, innovative concepts, as well as effective research methodologies and emerging technologies for effective business management.

IJBRM editors understand that how much it is important for authors and researchers to have their work published with a minimum delay after submission of their papers. They also strongly believe that the direct communication between the editors and authors are important for the welfare, quality and wellbeing of the Journal and its readers. Therefore, all activities from paper submission to paper publication are controlled through electronic systems that include electronic submission, editorial panel and review system that ensures rapid decision with least delays in the publication processes.

To build its international reputation, we are disseminating the publication information through Google Books, Google Scholar, Directory of Open Access Journals (DOAJ), Open J Gate, ScientificCommons, Docstoc, Scribd, CiteSeerX and many more. Our International Editors are working on establishing ISI listing and a good impact factor for IJBRM. We would like to remind you that the success of our journal depends directly on the number of quality articles submitted for review. Accordingly, we would like to request your participation by submitting quality manuscripts for review and encouraging your colleagues to submit quality manuscripts for review. One of the great benefits we can provide to our prospective authors is the mentoring nature of our review process. IJBRM provides authors with high quality, helpful reviews that are shaped to assist authors in improving their manuscripts.

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Information Technology Service Management (ITSM) Implementation Methodology Based on Information Technology Infrastructure Library Ver.3 (ITIL V3)

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Abstract

This paper is intended to cover the concept of IT Infrastructure Library Version 3 (ITIL) v3 and how to implement it in order to increase the efficiency of any Egyptian IT corporate and to help the corporate employees to do their work easily and its clients to feel the quality of services provided to them. ITIL is considered now as the de facto standard framework for IT Service Management (ITSM) in organizations which operate their business which is based on IT infrastructure and services.

ITIL v3 was implemented in western organizations but still it is a new framework for the Egyptian and Arabian environment. The best proof of the lack of ITSM in the Arab region and not Egypt alone is that the percentage of the companies which have ISO/IEC 20000 are less than 2% of the total certified companies in the whole world and in Egypt no company has it until now as stated on APMG ISO/IEC 20000 website[1]. Accordingly this paper investigates an implementation methodology of ITIL in Egyptian corporate taking into consideration the cultural factors and how it will affect the success of this implementation. We have already implemented this methodology in three Egyptian companies and it succeeded to increase the level of process maturity from level one to level four according the ITIL Process Maturity Framework (PMF) [2]

This paper will include an introduction about the problem Egyptian corporates are facing now, a brief introduction to ITIL V3 with its processes and lifecycle stage, related work, the implementation methodology, the results achieved, conclusion and the future work.

Keywords: ITIL V3, ITSM, PMF, ISO/IEC 20000 and Service Management.

1. INTRODUCTION TO ITSM NEEDS IN THE EGYPTIAN MARKET

It is clear nowadays that the size of any corporate that uses IT to handle their day to day business is increasing in a very fast way. These corporate are depending more and more every day on IT services and computing processing, that is why they must consider building and implementing a clear ITSM and its processes which can control all the IT services better. But when we look around us in almost every corporate now we can find them have more than one team of professional engineers who try to do their best in solving the day to day discovered problems and building new services and solutions too without any governing body like a formal written policy which defines roles and responsibilities of each one.

After some time the life of these teams will be very tough as they will turn to be fire fighters all the time, because the environment is increasing in size and complexity and it is changing every minute due to many updates, hot fixes and changing business needs too. The problem will increase if the corporate is a big corporate with different customers at different locations with different needs and needed customizations. The problems these teams face every now and then are due to:

1- Having no system maintaining and optimizing incident and problem management.
2- Having no system maintaining and optimizing change management.
3- Having no ability to design new services as they losing all their time in firefighting current incidents and problems and failed change implementations.
4- Working a lot of time every day and even having shifts in the weekends.
5- Losing their customers' satisfaction and loyalty.
6- Doing rework all the time as there is no documentation and knowledge transfer techniques.
7- Losing control over Service Availability, Continuity, Maintainability and Security because of current, remaining and reopened incidents and problems and failed change implementations.
8- Spending more money on Service without any increase in the Service output.

This is why the big companies need ITSM more than small ones and this does not mean that small companies do not need ITSM. It is clear that all companies need ITSM and it depends on the company size and management methodology in deciding to what extent it will need help from ITSM.

2. INTRODUCTION ITIL V3

ITIL V3 is now considered the best public framework for IT Service Management and it includes best practices for any IT service in any company whether this company is an internal IT department which provides services to internal employees and departments as depicted below in figure 1, a Shared Service Unit (SSU) which is an IT department in a group of companies and it delivers services to all the employees in the companies of this group as depicted below in figure 2 or an external service provider which serves other companies in the market as depicted below in figures 3:

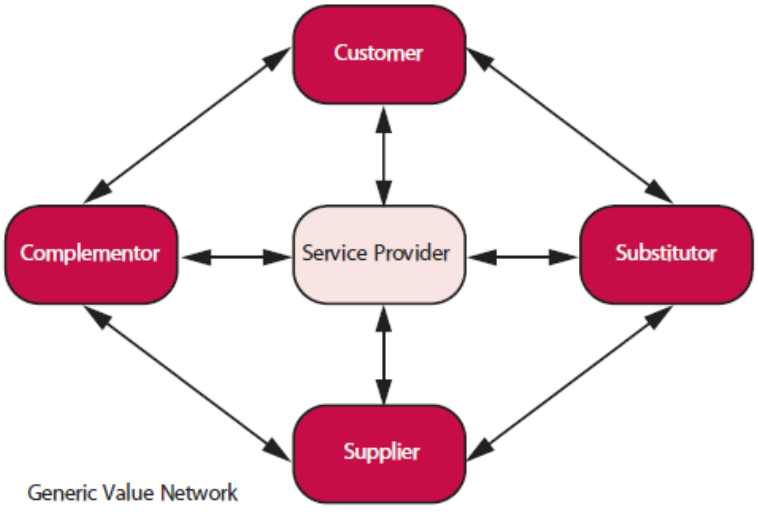

FIGURE 1: Internal Service Provider [3]

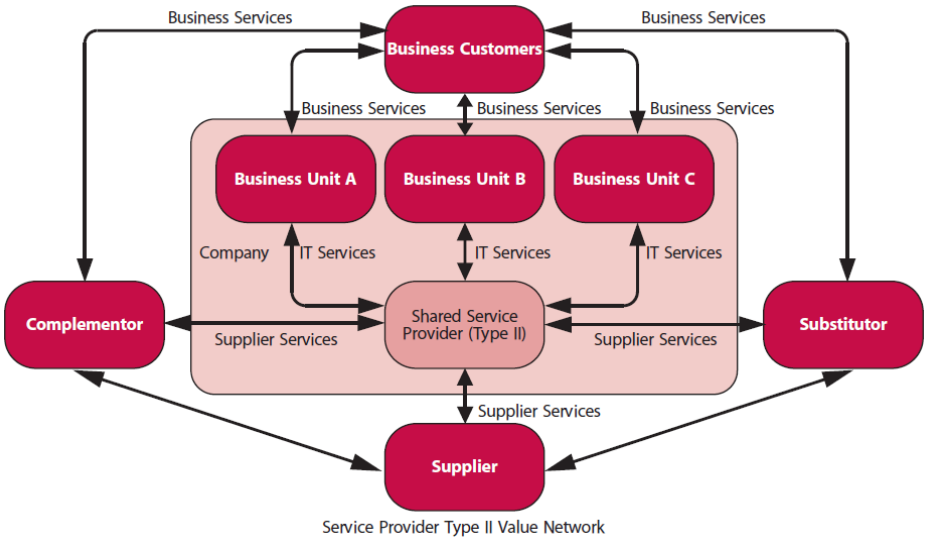

FIGURE 2: Share Service Unit Provider [4]

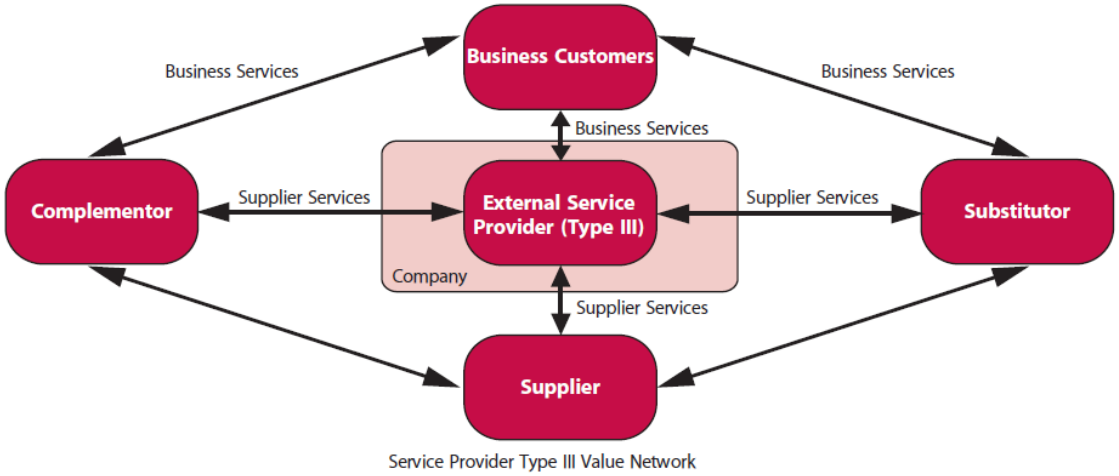

FIGURE 3: External Service Provider [5]

ITIL defines a service as “A means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks.” [6] which clarifies to every service provider the real meaning of service which is a value delivered to the customer to increase the capability of achieving goals with the companied risks and costs. ITIL V3 also divided any IT service lifecycle to five stages as shown in figure 4 and they are:

- Service Strategy which defines the customer needs and the ability of the service provider to decide whether to invest in these needs and whether they will be beneficial or not
- Service Design which designs the services with all its aspects like technical architecture, management systems, measurement systems and processes
- Service Transition which builds, tests and delivers the new and changed services
- Service Operation which run and maintain the services the customers use to reach to their business goals
- Continual Service Improvement which deals with the service throughout its lifecycle to ensure continual improvement to sustain the value of the service.

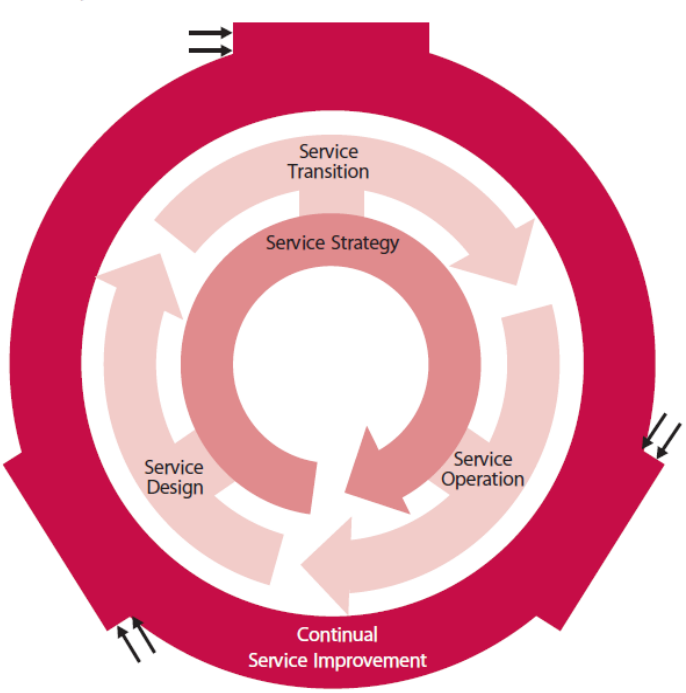

FIGURE 4: ITIL V3 Service Lifecycle [7]

The five stages of the lifecycle are shown in figure 5 contain about twenty processes.

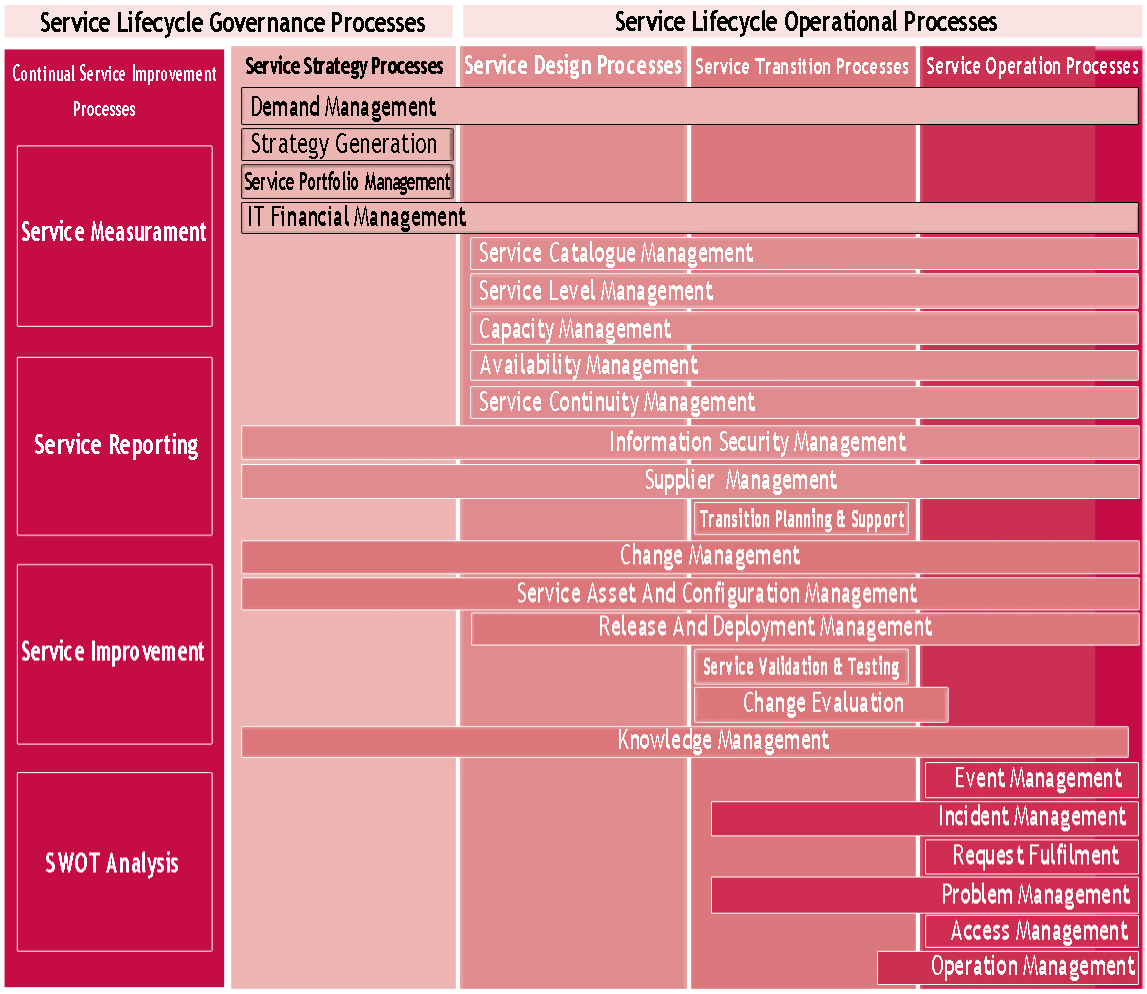

FIGURE 5: ITIL V3 Service Lifecycle Processes [8]

3. RELATED WORK

As stated on the ITIL official website [9] there are thousands of organizations worldwide which have adopted ITIL V3 like NASA, the UK National Health Service (NHS), HSBC bank, Disney, IBM, Telefonica, HP and British telecom (BT). We have implemented the following methodology in three companies in Egypt which are ASCOM, DP World and Nile.Com and we succeeded in raising the process maturity levels in the PMF in them all for three processes which are:

- Incident Management which "concentrates on restoring the service to users as quickly as possible, in order to minimize business impact" [10].
- Problem management which "involves: root-cause analysis to determine and resolve the cause of incidents, proactive activities to detect and prevent future problems/incidents and a Known Error sub-process to allow quicker diagnosis and resolution if further incidents do occur." [10]
- Change Management which "ensures that changes are recorded and then evaluated, authorized, prioritized, planned, tested, implemented, documented and reviewed in a controlled manner." [11]

3-1. ASCOM Company

The first company is ASCOM which is working in mining and has 350 employees served by an IT department containing five members including the IT manager. He described ASCOM by saying "ASCOM has an array of diversified services and activities and we are keen to offer them professionally to our customers. Over the three decades of its life, ASCOM has specialized in geological services, studying and evaluating raw materials quality, and presenting technical support for quarries operation. ASCOM acquired an excellent reputation in the technical services it presents to the mining sector. ASCOM's market share of the raw materials necessary for cement production exceeded 60% in Egypt." ASCOM IT department serves more than one company under ASEC which are ASCOM, NEBTA, ASCOM SYRIA, LAZREG, NMD Nubia, ASCOM CCM, ASCOMA, ASCOM Ethiopia and ASCOM Emirates for mining which makes the IT department a Share Service Unit Provider as shown in figure 2 above.

3.2 DP World

DP World Sokhna is located at the southern entrance of the Suez Canal, Egypt, 120 kilometers from Cairo. The port, which also lies adjacent to the North West Suez Economic Zone (NWSEZ), is a state-of-the-art maritime facility, seamlessly integrating cutting edge technology with the latest management and security skills.

Situated directly on the busy East-West trade route, DP World Sokhna is perfectly placed for the handling of maritime traffic into and out of Egypt and the wider region - and to other markets around the globe. DP World Sokhna boasts four quays, each easily able to handle cargo flows of up to several million tons. The IT Department only serves Al Sokhna port department and it is an Internal Service Provider as shown in figure 1 above.

3.3 Nile.com

Nile.Com Company can be introduced by its profile intro which was written by its chairman Mr. Ahmad S. Anwar. He says "We established Nile.Com SAE in 1999. Back then, Nile.Com consisted of a small privately owned stock holding company operated by a few employees. Our activities evolved around hardware and software systems sales as well as technical services provision. However, we were aiming high by having a clear-cut strategic plan: to become one of the top and most successful players in the ever changing and greatly challenging field of communication and information technology.

10 years later, after having expanded and relocated twice, that plan has become a reality: Nile.Com with a proven record of achievements was able to secure a high ranking within this dynamic competitive market by creating and successfully building top notch specialized teams who seek not only customers' satisfaction but also meeting vendors' objectives.

Now Nile.Com is considered one of the best ICT professional services providers in Egypt due to their achievements and their customers' feedback. The services Nile.Com provides to its customers are:
1-Infrastructure Solutions
2-Security Solutions
3-Business Continuity Solutions
4-Virtualization Solutions

NileCom Company serves many customers in the market and this is why it is considered External Service Provider as shown in figure 3 above.

4- ITSM IMPLEMENTATION METHODOLOGY BASED ON ITIL VER.3 FRAMEWORK

Although ITIL V3 contains best practices for any IT service, it does not cover how to implement ITIL in any organization as it covers WHAT and does not cover HOW. This paper will cover a

methodology which covers the implementation for ITSM based on ITIL V3 by combining many techniques and methodologies. The methodology consists of the following seven steps.

4.1 Define Current Processes and Needed Processes

It is well known that ITIL V3 has divided the IT lifecycle to five main stages which have about twenty main processes which cover all the aspects of an IT Service that could be at any company whether it is a small, medium or big company and they are shown in figure 5. Although these twenty processes cover all the lifecycle of any IT Service, no one can assume that all these processes must be found in every business.

Small business may include some of them while large and huge companies may include many if not all of them. For example in a small company which has a very small IT department it will be very difficult to find at all Service Catalog Management [12] which is a process responsible for having and maintaining a catalog which has accurate and updated information about all the current service provided by the service provider to its customers or Service Level Management (SLM) [13] process which manages the levels of the services the customers get from the service provider. While in a world class mobile operator which exists in many countries, each country will have a separate Service Catalog and Level Management process. In this dedicated Service Catalog there will be all the services provided to the people of this country. Maybe at the head quarter there will be a central Service Catalog containing all the service packages in the many dedicated Service catalogs in all the other countries including all their features and pricing. Also for the SLM process there will different service levels in each country according to the level of needs in the customers of this country while there will be some levels decided by the head quarter to be followed by all the other countries.

We start our research by discovering the existing and needed processes. There will be three types of processes which are: current processes, needed processes and unnecessary processes as they are not required by the business or are bigger than the maturity of the IT department.

4.2 Documenting Current Processes

After we define the current and needed processes there must be documentation for every existing process to know all about its activities and components. To define the process at this stage there should be a clear methodology to be a standard for documenting any process found in IT department. As mentioned in **The ITSM Process Design Guide** [14] process documentation should include seven components which we consider a good start for documenting any process in a small or medium company and they are:

- **Policy -** which controls the process and how it works. It includes also the targets of the process which are approved and recommended by the top management.
- **Narrative -** which tells the story of the process by stating its goal and objectives and how it works
- **Roles and Responsibilities -** which assign specific people to specific activities and it can use the RACI model [15] which stands for Responsible who is responsible for doing, Accountable who is managing, Consulted who should be consulted and Informed who is informed about status and updates to clarify the authority organization
- **Process Overview** - which describes how the process starts working from the input to the activities inside the process to the value which is the output of the process.
- **Process Maps** - which depicts the process in a drawing or diagram to make it easy to understand its internal components and its external relations.

- **Activities** - which are the tasks to be done so that the process can be operational. All these activities must be assigned to specific people.

- **Vocabulary** - which is the meaning of every word mentioned in the description of the process to make it clear to everyone whether he or she is specialized in the process and its technologies or not.

At the same time processes at big companies will need more details in the documentation. The sample process documentation mentioned in the ITIL V3 core publication Service Design [16] by The Stationery Office (TSO) will be enough as it includes a sophisticated structure and it includes:

- Process name, description and administration (documentation administration: version, change control, author, etc.)
- Vision and mission statements
- Objectives
- Scope and terms of reference
- Process overview: Description and overview, Inputs, Procedures, Activities, Outputs, Triggers, Tools and other deliverables and Communication
- Roles and responsibilities: Operational responsibilities, Process owner, Process members, Process users and Other roles
- Associated documentation and references
- Interfaces and dependencies to: Other SM processes, Other IT processes and Business processes
- Process measurements and metrics: reviews, assessments and audits
- Deliverables and reports produced by the process: Frequency, Content and Distribution
- Glossary, acronyms and references.

We believe that in some cases some processes may need another more customized model for documenting them. In the three companies we did not find any of these processes which may need special customization at all.

4.3 Use ITIL PMF to Measure Current Processes

We must measure the current processes to decide if they need improvement or redesign. If they are good they may need to be better to increase their effectiveness and efficiency to a higher level which makes it hard for competitors to reach to. If they are poorly documented, un-followed by the IT staff or un-sufficient for the ever changing needs and requirement of the customers, We must radically redesign in a proper manner. At the same time there could be some cases in which the business does not have processes at all and needs to start from the beginning.

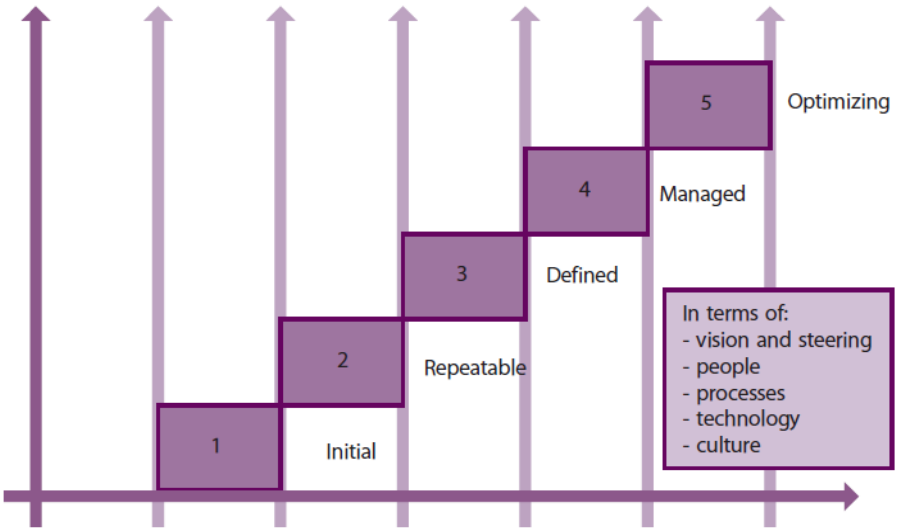

FIGURE 6: ITIL V3 PMF [17]

There should be a framework which covers how to assess a process. We use ITIL Process Maturity Framework (PMF) as shown in figure 6 in our assignments to measure process maturity and to know from where to start the improvement plan. ITIL PMF divides the process maturity into five distinctive levels which are Initial, Repeatable, Defined, Managed and Optimizing. The existing processes in any company will be assessed by the ITIL PMF to know at which level each process is living and what are the opportunities available to raise it to a higher level.

In the **Initial** level the change resistance to process development will be at the highest levels as IT staff is not acquainted with process and process management. To develop processes found in this stage there must be management commitment and resources allocated to the development plan. Unfortunately many companies have many processes at this initial stage in Egypt as process management is a new concept for them.

The second level is **Repeatable** where the IT department and the whole company start to gain more care about processes and knowledge but they are just starting. Processes in this level may need to be developed and may need to be radically redesigned totally to improve it. There are many challenges at this level like deciding from where to start and having dedicated resources to implement improvement. Change resistance at this level is not high as the whole company accepts to be improved in many sides and one of them is the IT.

The third level is **Defined** where the processes start to be clear and their development are accepted widely. The process at this level is more mature and can be developed more easily than the first and second levels but change resistance still exists. Management is supporting the IT processes powerfully and is expecting more order and organization to be seen clearly in the performance of IT department.

The fourth level is **Managed** which is a high level as IT processes are managed clearly. This level is not easy at all to be reached as it needs total agreement and approval from all IT staff and the company management to achieve high compliance to quality management in this department and its functions too. The maturity at this level needs to be always measured and maintained so that the good efforts are not wasted and lost. At this level IT staff has to be continually improved and trained to keep the level of the IT services. Also the company may have internal or external audits and monitoring.

The fifth and highest level is **Optimizing** which is not easy at all to be reached and very hard to keep. To have the processes in this level this means that the whole company believes in process maturity importance and the greatness of the effects of the process maturity on the whole business.

The PMF is not a new or strange framework as it has the same levels and their names of the Capability Maturity Model Integration (CMMI) [18]. PMF and CMMI have five levels while at the same time the ISO/IEC 15504 [19] has six levels but with different names. We preferred to use the PMF as it will suit the ITIL implementation most instead of integrating any other maturity model.

4.4 Improve Current, Develop New or Redesign Old Process

At this point any company could have one of four types of processes which are:

1- A needed process
2- A current process which needs to be improved
3- A current process which needs to be radically redesigned
4- A current process which is sufficient for business and does not need any improvement

At this point any Egyptian company starts to believe in the process management and its importance so there will be many processes which will be needed and they will be designed from scratch. The problem at the same time will not be in just convincing the IT staff of the new processes and how they will improve the quality of the IT service, but it will be also in convincing the client to deal with the process and its tools and applications. Although the client is a very important stakeholder and the one who gets the most benefits, the client will not accept any guidance in using the new processes easily. Many companies have some processes which may be good and effective but need some improvement.

All the points mentioned above in Defining and Documenting Current Processes part will be developed for each process with a sense of customization as every company has many processes and each one of them has special characteristics and requirements. This is why every process will need a sort of customization even to the default definition or documentation provided by ITIL framework. The level of customization will depend on the nature of the company, the services it provides and the customers and their level which will be captured through surveys, questionnaires, needs assessment and meetings with the stakeholders.

This methodology deals with the first three types of processes mentioned above and the forth only needs continual improvement to always satisfy its stakeholders' needs. For the first type which is which is a needed process the stakeholders will be defined and a meeting with them will be arranged whether together or separately to decide what are the process goals and objectives, inputs, outputs, needed resources and capabilities and its internal activities. After we collect all this info it will be easy to draw a diagram showing the process and all its components. We arrange a second meeting with all the stakeholders to show them the process diagram and if they agree we move to the next step and if they disagree we start a discussion about what is missing or is unnecessarily added. The next point will be starting documenting the process and all its components and interfaces to be standardized and show this new documentation to all the internal stakeholders to approve it and publish it internally to be available to all employees and specially the IT ones. Then the roles and responsibilities will be arranged in a RACI model and all its members will approve their roles to have a consensus about how to run the process and improve it accordingly. The most important point is to define a quarterly meeting for discussing the process and it efficiency and effectiveness and there will be an annual meeting to renew the documentation of the process. Throughout this year in the lifetime of the process any change will be controlled by the change management process.

For the second type which is a process which needs improvement there will be a meeting with all its stakeholders to collect all their goals and objectives and then collecting all the information available about it and all components to know where is the shortage. A gap analysis will be developed to know where the process is now and where it should be and a plan will be developed to narrow the gap or eliminate it if possible. The plan will be presented to the stakeholders in a meeting to get their feedback and acceptance combined with funds and responsibilities controlled by a top management commitment. The plan could have many solutions which may cover staff training, using new tools and technologies, managing the process interfaces better, building a RACI model for the process activities and many others. After the plan completes and succeeds the process documentation will be prepared and get approved and the whole process will be under the control of the change management process.

For the third type which is a process which needs to be radically redesigned there will be some additional work to the activated done for type two above as needs assessment will be conducted with all the stakeholders to define their needs clearly. The current process is refused from those stakeholders and there should be reasons for this and we must collect all these reasons before thinking in redesigning the process to have effective design. When the problems of the current process are discovered and agreed upon from all its stakeholders one or more solution will be presented to them and if they agree to develop one then the same steps we use in type two above will be used to complete the redesign of the process.

Also the process can have some drawings to make it clear to all the stakeholders including the client, the process owner, the service provider management, the technical staff including the service desk, infrastructure and application teams too and even the supplier if it is possible. We draw process map to make it easy for its stakeholders to understand it in a single glance instead of reading too much. ITIL V3 framework has provided us with some process maps like the Incident Management process map in figure 7 below which may be enough for the need of a company or which may need customization for some companies like the Incident Management process map in figure 8 below and at the same time there are some process maps which are not covered by ITIL so we have to start from scratch to develop them.

The three types covered above will need two shared activities and the first one is delivering awareness sessions to everyone inside the service provider and maybe the suppliers and customers about ITIL and its processes and functions which are teams of people who are asked to do specific work to achieve specific output. The second activity is giving the IT staff ITIL V3 training courses and examination to raise their level of knowledge and experience to manage the new and redesigned processes effectively after we complete our development and deliver the processes to them as there should be some staff development program in place as the staff needs development and training to be able to manage or follow a process. In some cases the existence of a software suite whether for the Service Desk or any other function will make the development result appear soon if there is no problem in using it by the users or a change resistance in using it from the beginning.

4.5 Define Strategy, Critical Success Factors (CSF) and Key Performance Indicators (KPI) for Each Process.

While we are developing current processes or designing new processes we start documenting the process as it is very important because having a process with no documentation is like having no process at all. A process needs a defined strategy to control it and to make it clear why this process must exist by mentioning its goal and objectives to make the need for it clear.

Each process has some or many success factors which control its quality. At the same time each process must have at least one if not two or three CSFs and it is our role to discover them and write them down. Although the client of a service may bear losing one or maybe two of the success factors he will never accept the absence of only one CSF. This is why we document and publish CSFs to all the employees of the service provider and specially the IT Staff.

KPIs are also important at this stage as they will help the process owner who is responsible for the process success and service owner who manages the service and all its components to measure the level of the process efficiency and effectiveness. We define the KPIs at the start of designing the process so that the process owner can use them effectively to manage it as there is a principle of Dr. Deming [20] in the ITIL which states that "If you cannot measure it, you cannot manage it" [15] and this is why KPIs are used to decide the measurement systems and their outputs.

After some time the KPIs, CSFs and process maps need to be changed and improved as the service is changing all the time to cover its customer's ever changing business needs and this is why we write in each process documentation the date of checking the suitability of documentation and the process to be followed in case a change is needed.

For example the selected Service Desk KPIs are:

- Number of Incidents
- % of Incidents answered within defined timeframe
- First-call Incident resolution rate
- Average number of calls / service request per Service Desk Agent
- % of escalated Incidents
- % of unresolved Incidents
- Number of Service Requests
- % of First line service request closure
- % of reopened service requests
- % of escalated service requests to other functions

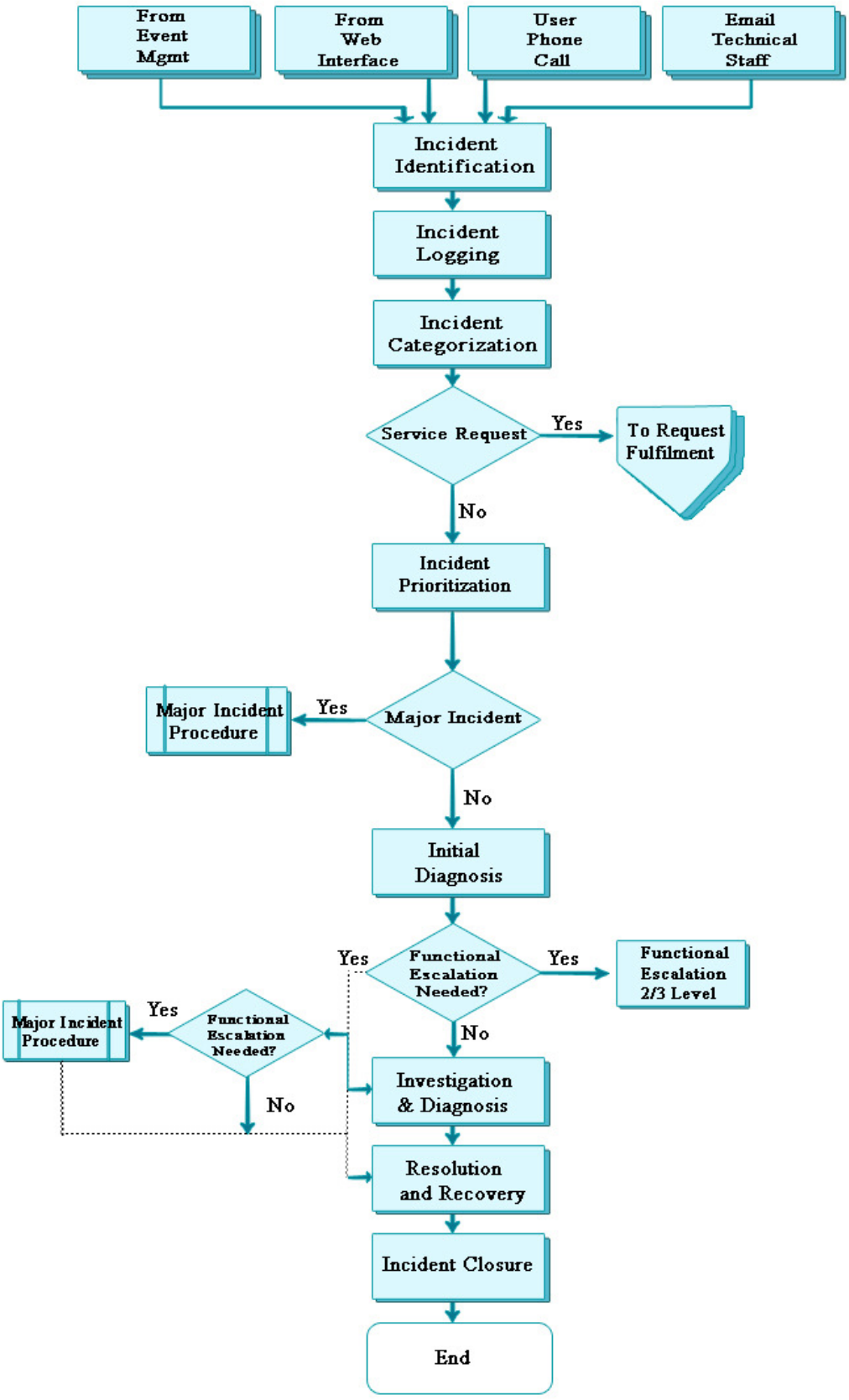

FIGURE 7: ITIL V3 Incident Management default Process [21]

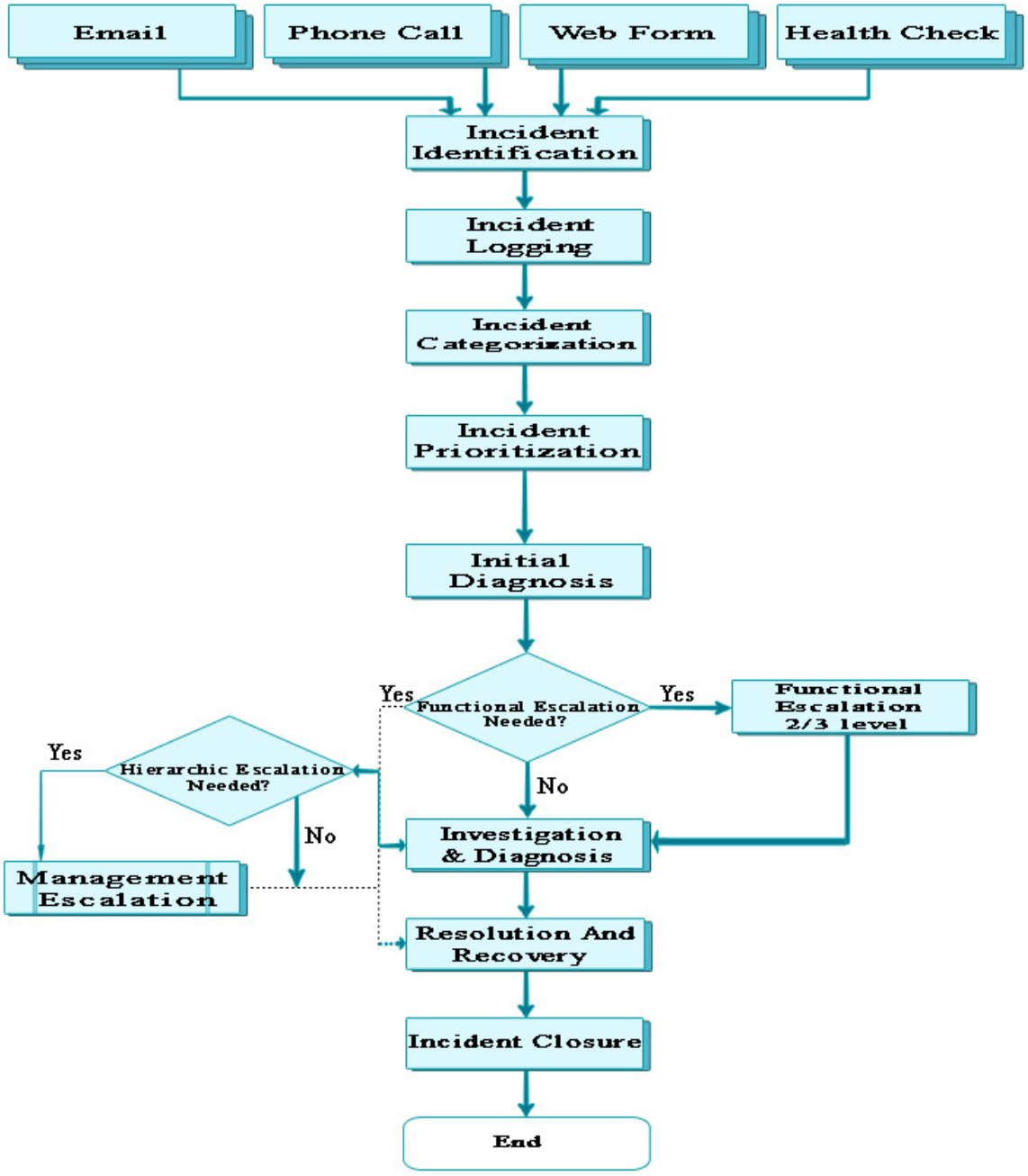

FIGURE 8: ITIL V3 Incident Management customized Process

4-6. Building Metrics to Measure Main Functions and Processes

The ITSM Process Design Guide [22] has a ten steps metric program which describes how to create suitable metrics in an easy way without any complication or buying any expensive software. We are using this technique for three years now and it is a very successful one. At the beginning of the implementation the first four or five steps will be easy to be accomplished and the others can be developed in the later stages as they are more advanced than the first ones. These simple ten steps we have arranged them in a flow chart and they are shown in figure 9 below:

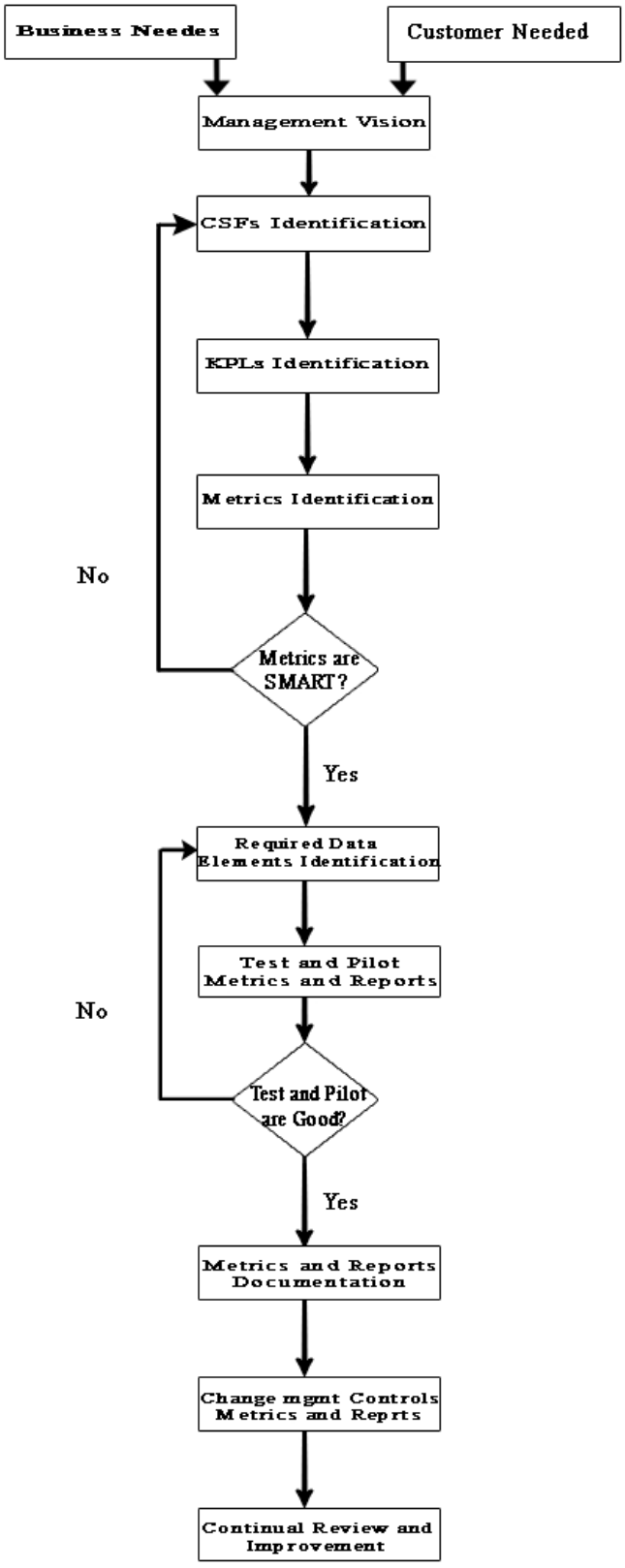

FIGURE 9: ITIL V3 Incident Management customized Process

After applying these simple ten steps the company can have suitable metrics which can measure the efficiency and effectiveness of any process or function to be able to manage them.

4.7 Use ITIL PMF After the Implementation to Measure Improvement in Processes

When the design, redesign, development, documentation, drawing of process, stakeholder awareness about ITIL and IT staff training on ITIL are completed there must be some kind of improvement. There could be no improvement and this could be due to a wrong theory or to wrong implementation. To measure this improvement we use the ITIL PMF again to calculate the difference between the process before the implementation of this development methodology and after it.

Not all the processes will have significant improvement after the first try, and this is why continual improvement is required. At the same time while the maturity of a process increases the maturity and experience of the process owner increases too. Not only the service and process owners will feel the improvement of a process but also the client and in some cases the supplier as well. The ITIL PMF will be used to guide the decision makers to decide if the time, resources and money spent were enough or not and if there is any Return On Investment or not.

5 EXPERIMENTAL RESULTS AND PERFORMANCE EVALUATION

This methodology has been used in three companies in Egypt which are ASCOM, Nile.Com and DP World for the incident, problem and change management processes and it succeeded very much with the three and the levels of PMF before and after the implementation prove its success as shown in the next table:

Participating Company	Process	PMF Level Before Implementation	PMF Level After Implementation
ASCOM	Incident Management	First Level Initial	Forth Level Managed
	Problem Management	First Level Initial	Forth Level Managed
	Change Management	First Level Initial	Forth Level Managed
DP World	Incident Management	Combined processes first Level Initial	Third Level Defined
	Problem Management		Third Level Defined
	Change Management	First Level Initial	Third Level Defined
Nile.Com	Incident Management	Combined processes first Level Initial	Forth Level Managed
	Problem Management		Third Level Defined
	Change Management	NA	Third Level Defined

TABLE 1: The PMF levels before and after implementing the methodology.

Now the three companies have documented processes which are used to manage their IT services and are baselined with RACI model to define authorities. Whenever any change is needed to the process or its documentation the change management process will control it to have stable environment. All the processes now have diagrams, CSFs, KPIs, SLAs, OLAs and review meetings to control their efficiency and effectiveness.

The three companies have decided to use a software solution for ITSM and there were many comparisons among many vendors and their software. While there are big vendors like IBM, HP and Microsoft there were many other small vendors with simple and cheap solutions. The three companies have chosen to user tools from other vendors as ASCOM and DP World have decided to use Service Desk Plus by Manage Engine and Nile.Com has chosen System Center Service Manager by Microsoft.

Participating Company	Chosen Software Tool	Software Tool Vendor	Implementation
ASCOM	Service Desk Plus 8.0	Manage Engine	Implemented
DP World	Service Desk Plus 8.0	Manage Engine	To be implemented next year
Nile.Com	SCSM 2010	Microsoft	To be implemented next year

TABLE 2: The participating companies' chosen software tool, vendors and implementation status.

The three participating companies tried to develop and use both Service Level Agreements (SLA) which is described by the OGC as "An SLA is a written agreement between an IT service provider and the IT customer(s), defining the key service targets and responsibilities of both parties."[23] and Operational Level Agreement (OLA) which is defined by the OGC as "An OLA is an agreement between an IT service provider and another part of the same organization that assists with the provision of services"[2 3] to control relations with customers and internal technical functions but not all of them could achieve this target. The next table will compare between the three participating companies:

Item	ASCOM	DP World	Nile.Com
SLA	Implemented	Implemented	Implemented
OLA	Implemented	Will be implemented in the 3rd Quarter	Will be implemented in the 3rd Quarter

TABLE 3: SLA and OLA implementation status.

ASCOM Service Desk KPIs in just six months after implementing the methodology are:

- Number of Incidents 2780
- 90 % of Incidents answered within defined timeframe
- 99 % First-call Incident resolution rate
- Average number of calls / service request per Service Desk Agent 659 (4 Agents)
- 1 % of escalated Incidents
- 0 % of unresolved Incidents
- 90 % of First line service request closure
- 1 % of reopened service requests
- 1 % of escalated service requests to other functions

ASCOM IT manager considers these KPIs a great improvement as ASCOM did have any process documentation, RACI model, KPIs or CSFs before six months. The other two companies are waiting for the new budget to but the selected software and to complete the Service Desk part in the ITSM implementation project.

The three companies now have better process to manage their IT services and have better customer satisfaction. Now they are thinking in implementing the other ITIL processes in the near future to have the best practices in IT service management in preparation for ISO/IEC 20000 certification.

6 COMPARATIVE EVALUATION

One of the best sources of process development theories is the book The ITSM Process Design Guide [24] by Donna Knapp which has ten chapters covering all the topics of process developing, reengineering and improving following an introduction to quality management principles. This book is very good for the use of reference for those who are interested in learning how a process design engineer but it does not give any scenario or case study from real world with a comparison of the as-is and to-be states as this methodology does for three companies with different types and size.

Also it has described many techniques for defining and analyzing customer requirements, process design and improvement tools and IT Service Management Technologies which qualifies it to be a reference instead of a simple to follow methodology.

- It has ten steps for process design and improvement and they are:
- Determine management\s vision and level of commitment
- Establish a project and form a project team
- Define the process and identify customer requirements
- Document the “As Is” process and baseline current performance
- Assess conformance to customer requirements
- Benchmark current performance
- Design or redesign process
- Solicit feedback, fine-tune and finalize the design
- Implement the new process
- Assess performance and continually improve.

In these ten steps the writer did not use PMF to measure the process before and after process development as our methodology does and she used the conformance to the customer requirements before the development and the performance after it although she has mentioned the PMF before as a measurement techniques.

Knapp has paid attention to awareness and training as we did but there is a big difference between the needs of the companies in USA and those in Egypt and other Arab countries as in USA ITIL and other frameworks are known and used for many years now and many companies have ISO/IEC 20000 certification while in Egypt and other Arab countries ITIL is a new framework and there is a few number of companies or individuals who know It or are able to implement it in an environment which fight change by all the strengths it has.

7 CONCLUSION

Although ITIL V3 is considered the best public framework which includes the best practices in the IT field, it provides its readers with only the theory and not the implementation methodology. This is why we tried to create a methodology based on many fields like System Analysis and Design, Project Management, Advanced Software Engineering and Process Design Engineering and this is one of the reasons of the success of this methodology. This methodology succeeded three times in the three companies mentioned above and it can be developed more and more according to the needs of the company which needs the development.

8 FUTURE WORK

In the future we will try to develop a software for Service Desk including many ITIL V3 processes using a web portal like Microsoft SharePoint portal [25] which combines many features and can be customized too and publish it on a public cloud [26] by using the infrastructure of the public cloud provider as an Infrastructure as a Service (IAAS) [27] and offer it to many companies in a pay-as-you-go model and as a Software as a Service (SAAS) [28] to reduce the cost of implementing ITSM using many software solutions with very high costs and having many IT staff to run and manage them.

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Perceived Quality and Attitude Toward Tea & Coffee by Consumers

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Abstract

The main purpose of this study is to determine the consumers' perception and attitude toward Tea and Coffee. Total 100 South Korean consumers participated as respondents in this study. Fishbien's Multi-attribute attitude model and t-test were used to measure hypothesis and compare attitude toward Tea and Coffee. Findings indicate that consumer attitudes toward Coffee and Tea differed significantly among consumers in Korea. Consumers had an overall more positive attitude towards Coffee compared with Tea with regards to availability, different flavor, and environment of shop attributes. In contrast, mean value and t-value indicate that there were no significant differences in aspects of freshness, habitual facts, and status, but correlation value indicate that there were some differences with regards to freshness and status. Findings of this study are only related to the consumers from South Korea, study period was September 2010 to January 2012, and maybe it is not generalized to other nationalities or countries. The research hints that the Tea Company should give attention to its marketing strategy on enhancing the attributes of "different flavor", "availability" and "good environment of shop". This study fills a gap in the literature on coffee and tea in business research.

Keywords: Consumer Attitude, Tea and Coffee, Fishbien's Model, Perceived Quality, Korea.

1. INTRODUCTION

Tea and Coffee are the regarded as the most popular temperance drink in the world. Every day billions of cups of tea and coffee are consumed by the consumers. The competition is more because of big market. So, most of the companies emphasize on differentiate their product from competitors. Perceived quality is one of the bases of this quality measured by the consumers'. So, in sometimes it becomes essential for some companies to improve the quality of their product. Now-a-days huge numbers of consumers are shifting their preference Tea to Coffee. This is alarming for tea industry. This study will also focus on that area and show how it can cope.

Important Variable of This Study

Perceived quality: Quality can be an overall evaluation of a product quality most commonly refers to a degree of excellence or finesse often in conformance to a pre-established standard. The American society for quality control defines quality as the totality of features and characteristics of a product or services that bear on its ability to satisfy customers' need. Quality as an elusive construct likes beauty is a key competitive weapon in the global market place. Quality cannot be defined precisely; it is simple, unanalysable property that we learn to recognize only through experience (Parasuraman, Zeithamal, and Berry, 1985).

Monroe and Krishnan (1985) defined perceived quality as the perceived ability of product to provide satisfaction relative to available alternatives.

Consumers' Attitudes, opinions and beliefs: Attitudes are a person's knowledge and positive or negative cognitive evaluation most an object such as product or service. It is one of the most important concepts marketers use to understand consumer, others combined three response types (thoughts, feelings, and actions) into the tripartite model of attitude.

Finally we can say that consumer attitude as a person's overall evaluation of a concept. In this study consumer attitude is related with the cognition, affect, predisposition, socialization, and experience of consumer's on Coffee and Tea.

Approaches in defining quality (By Gravin 1984b),
Transcendent approach: Quality, like beauty, can only understand after one is successively exposed to the characteristics of an object.

Product-based approach: This approach views quality as a measurable variable. It assumes that if a product possesses more desired attribute than other products the product is considered as higher quality.

User-based approach: Product that better satisfy consumers is high quality product. If the products cannot satisfy consumers that product is not higher quality even though it has objectively better characteristics.

Manufacturing-based approach: The essence of this approach concerned with engineering and manufacturing practice. The primary emphasis is productions control to reduce overall costs of producing a product.

Value-based approach: This approach suggests that the quality product is one which performs satisfactory at a reasonable cost.

Based on the five approaches in defining quality, Gravin (1984a, 1984b, 1987) mentioned eight dimensions of quality for various product categories, performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality with respect to consumers' durable.

Brucks and Zeithaml (1991) identified six dimensions of perceived, quality, ease of use, functionality, serviceability, durability, performance and prestige. Examples of each dimension, Ease of use: How it should be used. The brand is easy to start and operate.

Functionality: The brand has unique functions that cannot be found in other brands.
Serviceability: Parts for the brand are easily obtainable and service warranty of brand is well honored.

Durability: The brand has longer product life than most other brands and requires less service.
Performance: The brand does the basic job very consistently.
Prestige: The brand reflects a high degree of social status.

2. IMPORTANCE OF THE STUDY

By performing this study the quality dimensions of Tea and Coffee will be measured. It will help to understand the consumers' evaluation and strategy formulation.

3. LITERATURE REVIEW

3.1. Coffee & Tea

(Boughton and Ian, 2005) note, from the current scenario we see that the demand of coffee is more than tea and earning good amount of profit. It is assumed that about 20 billion cups of hot drinks are sold every year. In the UK tea sales have fallen by 84 million pound in the last five

years. Taste also changing all around the world, British customers drank more café latte (47.4%) than cappuccino (47.1%).

(Capone and Lisa, 2009) indicate that Present coffee buying habit introducing a niche market for shade coffee. Speakers at a SCAA workshop said that though the coffee buying in U.S. decreasing but the specialty or gourmet coffees market is rising.
(Freeman and Laurie, 1997) find out that day by day the iced tea and iced coffee demand are increasing and beverage departments also keeping their space for these cold coffee and tea. Star buck's also introduced cold Cappuccino coffee drinks which has achieved a very positive market response

(Sorensen and Chris, 2011) note that in Canada, Star bucks has a pilot project to open Best branded "coffee bars" inside four Wal-Mart supercenters and another four to opened over the next year. "It is a new concept for us. They are coffee bars with a walk-up window on one side and a bar to linger at on the other," says Jenny McCabe, a Star-bucks spokesperson. "We think we can simplify premium coffee and make it really accessible."

(Boughton and Ian, 2011) mention that Coffee vending machine given a chance to drink ready-made coffee in a plastic cup. The full concept is to drink coffee wherever and whenever you want with self-service. Though the Coffee and Tea is the most consumed beverage in the world after water, but we see very few writings of the beverage of tea in hospitality aspects. Hospitality is defined by the Oxford English Dictionary (2002, p. 1213) as "the friendly and generous reception of guests or strangers". The offering of a cup of tea is a universal sign of hospitality, in either a home or commercial hospitality setting (Walton, 2001). Taking tea at afternoon is common habit to many people and its origin in Britain. Media reports (Kelly, 2001) show that many hotels are now serving afternoon tea for the different clients.

Fairmont Hotel web site (2004a) notes "Premium tea business is soon to become the new lunch". Profit may be a partial motive for the extension of traditional afternoon tea hours, as the tea meal service affords hoteliers the opportunity to use dining facilities beyond the traditional hours for breakfast, lunch and dinner.

Green tea is rich in possibilities as a functional food and is a popular beverage among the new health-conscious generation. Research has started to remove the veil concealing some of its true power as a functional food as attention is being paid to the role of green tea in bio-regulating functions (McKay & Blumberg 2002; Erba et al. 2005; Williamson & Manach 2005; Cabrera et al. 2006); bio-defense function by preventing cancer (McKay & Blumberg 2002; Wu & Wei 2002; Higdon & Frei 2003; Lambert & Yang 2003; Horie et al. 2005; Shimizu et al. 2005; Arts 2008; Ashihara et al. 2008; Wang et al. 2008), disease preventing function by preventing high blood pressure or diabetes, disease-recovery function by inhibiting the rise of cholesterol inflammatory activity (Wang & Helliwell 2000; McKay & Blumberg 2002; Ashihara et al. 2008), physical rhythm-controlling function by stimulating the central nervous system with caffeine and aging-suppressing function by providing the body with antioxidants (McKay & Blumberg 2002; Jeong & Kong 2004; Bunkova et al. 2005; Kuzuhara et al. 2006; Kotani et al. 2007; Raza & John, 2007).

3.2. Perceived Quality and Attitude

The concept becomes indistinct when scholars in different disciplines tend to view quality from different standpoint. However, we should not forget that consumers' serve the ultimate judge of the quality in the market place. Ever well designed, defect free products can fail if they do not fit consumers' perceptions of high quality. Thus, Monroe and Krishnan (1991) defined quality as "the perceived ability of product to provide satisfaction relative to available alternatives.

Perceived quality is the consumer's judgment about an entity's overall excellence or superiority (Zeithaml, 1988). It differs from objective quality (as defined, for example, Gravin 1984a and Hjroth Anderson 1984); it is form of attitude, related but not equivalent to satisfaction, and result from a comparison of expectations with perceptions of performance.

Perception of quality is based on subjective perceptions of intrinsic attributes (Gravin, 1984); and/or extrinsic like manufacturer's image, price and country of origin and other (Dodds et al. 1991; Lee's (1999); Teas and Agarwal 2000; Zeithml, 1988). However, it may also contain affect that is not reflected in the measured attributes, even when a large set of attributes is included. Thus, Lee's (1999) definition to overcome the previous controversies deserves special attention because of it's all inclusiveness characteristics. He defined perceived quality as "consumer's evaluative and effective judgments concerning the overall excellence of a brand based on intrinsic as well as extrinsic attributes which are directly related to his or her satisfaction with that brand."

Gravin (1984 b) proposed five approaches in defining quality, Transcendent Approach, product-based, user-based, Manufacturing-based, value-based approach. Among there five approaches; definitions are generally equated with perceived Quality (Zeithaml, 1988). The major focus of perceived quality is the consumers' satisfaction and related subjective perceptions of the products attribute (Gravin, 1984).

Based on the five approaches in defining quality, Gravin (1984a, 1984b, and 1987) mentioned eight dimensions of quality for various product categories, performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality with respect to consumers' durable, Brucks, and Zeithaml (1991) identified six dimensions of perceived, quality, ease of use, functionality, serviceability, durability, performance, prestige.

From the above literature review we can see that almost all the literature in Tea & Coffee part has taken from Pure Science journal or magazine, there is no any Business journal or Business related full research paper where it is discussed Tea & Coffee related things in the perspective of consumers, that is why this paper is unique.

4. PROBLEM OF THE STUDY

In this research work three types of problems have been identified. The problems are as follows: (a) what are the attributes contribute the perfect role on perceived quality of tea and coffee? (b) What are the dissimilarities between tea and coffee in aspect of perceived quality?
(c) What are the consumers' attitudes and opinion regarding the perceived quality of tea and coffee drinks?

5. STATEMENT OF THE RESEARCH OBJECTIVE

a. To identify different attributes that have important role on the perceived quality of tea and coffee.
b. To compare tea and coffee from perceived quality viewpoint.
c. To know consumers' attitude and opinion regarding perceived quality of tea and coffee.

Finally, to propose some recommendations on the basis of these research findings which will be helpful for the company to survive in the competitive market

6. RESEARCH METHODOLOGY

6.1. Pre-testing

The purpose of this test was to obtain a list of salient attributes of tea and coffee.

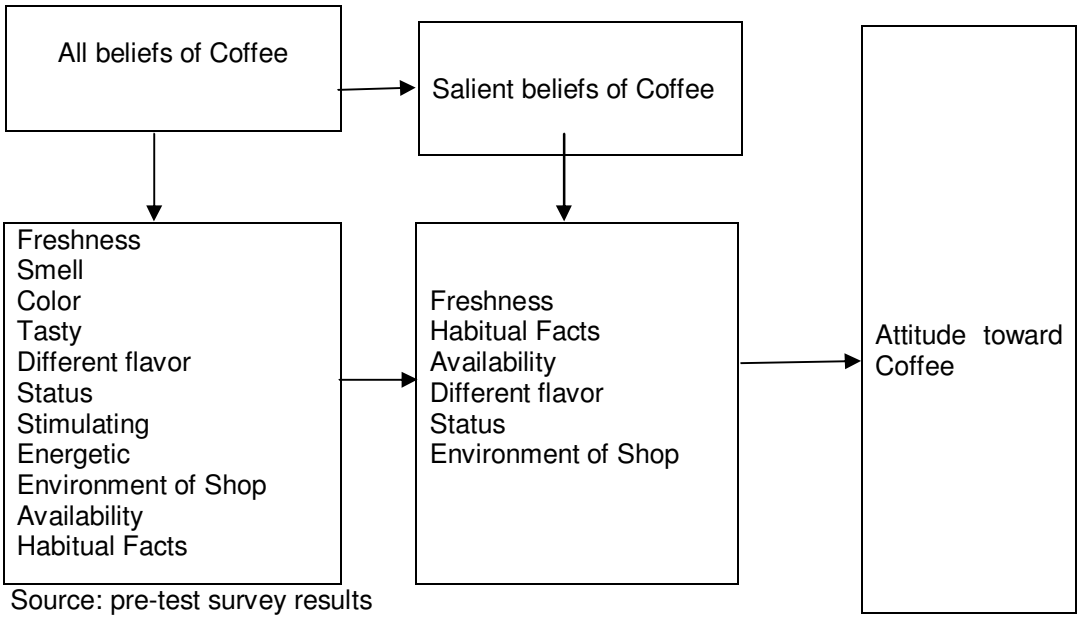

FIGURE 1: All beliefs and salient beliefs of Coffee

Figure-1 shows the pre-test results of coffee, where all beliefs mean all the attributes which are normally mentioned in package in any product, or marketer claim the attributes which are associated with the product. There are eleven attributes we found in our study as all beliefs in coffee. And Salient belief means activated beliefs, the attributes which a customer can recall while purchasing any product. From figure we see that there are six salient beliefs in coffee. From all beliefs create salient beliefs, and salient beliefs help to form attitude. The pre-test question was “Please mention various attributes which you usually consider when drink coffee”.

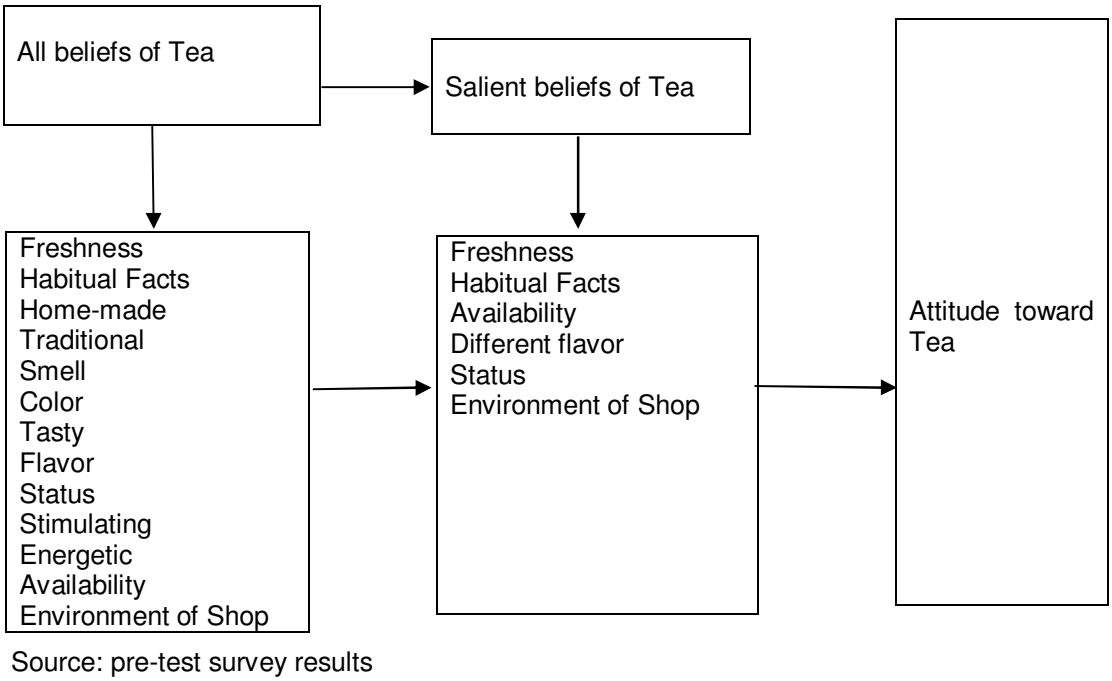

FIGURE-2: All beliefs and salient beliefs of Tea

In the same way Figure-2 shows the pre-test results of tea, where there are thirteen all beliefs of tea, two more (Home-made, Traditional) than coffee, and six same salient beliefs. From all beliefs generate salient beliefs and salient beliefs help to form attitude toward any object or product. And the pre-test question was "Please mention various attributes which you usually consider when drink Tea".

6.2. Hypothesis of the Study

As the quality dimension may vary of tea and coffee. So, the consumers' may perceive the two products differently. The hypothesis is:
H=There are some differences between tea and coffee from the consumers' perceived quality perspective in the aspects of Freshness, Habitual Facts, availability, Different flavors, Status, and Environment of Shop.

6.3 Sample

The mall-intercept method was used to collect most data (n=65) in the city of Kwangju, South Korea. Rests of the questionnaires were administered to students and employees of Chonnam National University to increase the heterogeneity. The majority of respondents were age 20 -40 years old, and men were 60% and women 40%.

6.4 Data Collection and Data Analysis

First the data was collected from the respondents and calculated by using the Fishbein's model. The data were analyzed through t-test and significant level was 5%. And as per testing results necessary interpretations and comments are made.

7. RESULTS

7.1 Overall Attitude Measurements

Much of marketing research has focused on developing models for predicting the attitudes produced by this integration process. Of these Martin Fishbein's model has been most influential in marketing. The key proposition is Fishbein's theory is that the evaluation of salient beliefs because overall attitudes toward an object is a function of two factors. The strength of salient beliefs associated with the object and the evaluations those beliefs.

7.2 Formally the Model Proposed That

Ao = $\sum_{i=1}^{n} bi ei$

Where, Ao= Attitudes toward the object, in this study two objects are Tea and Coffee

bi = The strength of the belief that the object has attributes means, how strongly consumers believe that in Tea and Coffee have that attributes.

ei= the evaluation of beliefs i; means when consumers purchase tea and coffee how much important of that attributes are.

n= the number of salient beliefs about the objects. Here we have six salient beliefs for tea and coffee; those are Freshness, Habitual Facts, Availability, Different Flavor, Status, and Environment of Shop.

After inputting values -
Ao (Attitude Coffee) = $\sum_{i=1}^{n} bi ei$

Ao=Attitude toward Coffee

bi=the belief while drinking coffee will lead to certain attribute.

ei= the evaluation of the importance of the attributes

$$Ao = (b1 \times e1) + (b2 \times e2) + (b3 \times e3) + (b4 \times e4) + (b5 \times e5) + (b6 \times e6)$$

$$(5.40 \times 1.79) + (5.18 \times 1.85) + (6.49 \times 2.68) + (6.50 \times 2.53) + (4.19 \times 0.95) + (6.63 \times 2.62)$$

= 9.666+9.583+17.393+16.445+3.980+17.370

=74.44

Ao (Attitude Tea) =$\sum_{i=1}^{n} biei$

Ao=Attitude toward Tea

bi=the belief while drinking tea will lead to certain attribute.

ei= the evaluation of the importance of the attributes

$$Ao = (b1 \times e1) + (b2 \times e2) + (b3 \times e3) + (b4 \times e4) + (b5 \times e5) + (b6 \times e6)$$

$$(5.16 \times 1.56) + (4.95 \times 1.25) + (2.37 \times -1.78) + (1.25 \times -2.69) + (4.04 \times 0.32) + (1.20 \times -2.62)$$

= 8.0496+6.1875 - 4.218 – 3.362 + 1.292 – 3.144

= 4.81

The overall attitudes of consumers' on coffee (Ao=74.44) is very higher than the attitude of Tea (Ao=4.81). So the consumers' overall attitudes on coffee are comparatively better than that of Tea.

	Attributes	Mean	Standard deviation	1	2	3	4	5	6
1	Freshness	5.4000	.95346	-	.015	.747**	.436**	-.152	.508**
2	Habitual Facts	5.1800	.55741			-.019	-.057	.593**	-.136
3	Availability	6.4900	.77192				.600**	-.226*	.702**
4	Different Flavor	6.5000	.94815					-.223*	.725**
5	Status	4.1900	.59789						-.349**
6	Environment of Shop	6.6300	.58006						-

**p<0.01, *p<0.05 (Strongly believe +7 +1 strongly disbelieve)

Source: Developed from the research

TABLE-1: Mean, Standard Deviation and Correlation matrix of Coffee (bi data)

	Attributes	Mean	Standard deviation	1	2	3	4	5	6
1	Freshness	5.1600	.83750	-	.724**	-.624**	-.028	.187	-.006
2	Habitual Facts	4.9500	.72995			-.768**	-.310**	.228**	-.344**
3	Availability	2.3700	.59722				.612**	-.205*	.530**
4	Different Flavor	1.2500	.43519					-.376**	.866**
5	Status	4.0400	.86363						-.489**
6	Environment of Shop	1.2000	.40202						-

**p<0.01, *p<0.05 (Strongly believe +7 +1 strongly disbelieve)

Source: Developed from the research

TABLE-2: Mean, Standard Deviation and Correlation matrix of Tea (bi data)

Table-1 and 2 show the mean value of six attributes, standard deviation and Pearson correlation value of coffee and tea respectively. And the scale was 7 point Likert type scales, starting from strongly believe 7 and strongly disbelieve 1. The same scale was used in hypothesis test and paired correlation analysis in table-4. The mean value of six attributes of coffee in this table were used as (bi) data to measure the attitude toward coffee in Fishbien's model, and in the same way mean value of six attributes of tea were used to measure attitude toward tea. Overall, the correlations are modest, but with a substantial number being statistically Significant ($p < 0.01$ and $p<0.05$). The strongest was between freshness and availability (.747) in case of coffee, in case of tea it was between different flavor and environment of shop (.868).

Attribute of Coffee	Mean	Std. Deviation	Attribute of Tea	Mean	Std. Deviation
Freshness Coffee	1.7900	.53739	Freshness Tea	1.5600	.65628
Habitual facts Coffee	1.8500	.55732	Habitual facts Tea	1.2500	.57516
Availability Coffee	2.6800	.46883	Availability Tea	-1.7800	.52378
Different flavor Coffee	2.5300	.65836	Different flavor Tea	-2.6900	.77453
Status Coffee	.9500	1.45904	Status Tea	.3200	1.00383
Environment of shop Coffee	2.6200	.61595	Environment of shop Tea	-2.6200	.97214

* Strongly favorable +3 +2 +1 0 -1 -2 -3 strongly unfavorable

Source: Developed from the research

TABLE-3: Average evaluation of beliefs of coffee & Tea (ei data)

Table-3 shows the mean value and standard deviation of six attributes of coffee and tea, in this case the scale was different from that of table 1. It was also seven point scale with negative value and "zero" was neutral. The starting point was strongly favorable +3 and strongly unfavorable -3. Mean value from this table were only used as (ei) data in the attitude measurement model. SPSS IBM 19.0 was used in all statistical analysis in table-1, 2, 3 and 4.

7.3 Test of Hypothesis

Attributes		Correlation	t-value
Pair 1	Freshness Coffee – Freshness Tea	.223**	1.531
Pair 2	Habitual facts Coffee – Habitual facts Tea	.047	1.165
Pair 3	Availability Coffee – Availability Tea	-.704***	32.555***
Pair 4	Different flavor Coffee – Different flavor Tea	-.477***	43.121***
Pair 5	Status Coffee – Status Tea	-.250**	1.286
Pair 6	Environment of shop Coffee – Environment of shop Tea	-.546***	62.591***

* **= p< 0.001, **p<0.01 (Strongly believe +7 +1 strongly disbelieve)

Source: Developed from the research

TABLE-4: paired t-test and Paired correlation result:

Table-4 shows the hypothesis test result and correlation value. The test of hypothesis involved for comparing between coffee and tea from the consumer perceived quality perspective. In order to determine which Drinks attributes made this difference Significant, consumer attitudes toward Tea- and Coffee were compared for each of the Tea and Coffee attributes separately.
Consumers gave higher evaluations for Coffee than Tea on all six attributes, but among six attributes three were significantly high differences, that three attributes were–Availability, different flavor, and environment of shop. In table-1 in the aspect of availability the mean value of coffee were 6.49, tea 2.37; Different flavor-coffee 6.50, tea 1.25; Environment of shop-coffee 6.63, tea 1.20; and in Table-4 paired t-value were availability (pair 3) 32.56, Different flavor (pair 4) 43.12, environment of shop (pair 6) 62.59 and the significant level were p<0.001 for these three attributes, meaning that consumer had a more positive attitude toward coffee than tea for these attributes.

However, the results indicated that there were no significant differences between Tea and coffee regarding Freshness (mean value of coffee 5.40, tea 5.16, and t-value 1.531), Habitual facts (mean value of coffee 5.18, tea 4.95, and t-value 1.165), and Status (mean value of coffee 4.19, tea 4.04, and t-value 1.286), from table-2 and table-4 respectively. Paired Correlation value also indicated the same results-there were significant differences among three attributes availability, different flavor, and environment of shop and correlation value also indicated that there were some differences in aspects of freshness and status.

8. DISCUSSION

After analyzing Martin Fishbein's attitude model, we can easily understand by showing above figures the overall attitudes of consumers' about the quality of coffee is different from the tea. From the model we see that the overall attitude toward coffee is better than tea. This study shows (t-statistics, mean value, and correlation value) that there were some reasons,

Firstly, in tea there are not enough variation of flavors, different consumers choice are different they expect and like different flavor and taste, but there is limited option in case of tea; may be tea marketer never think this aspects and from the ancient period it is serving as it is, and they think that, this is traditional drink item and they should not do any experiment on it, and always serve with fresh water. On the other hand coffee companies are well aware about consumers' choice and continuously introducing different types of flavor to the consumers. For example if we

think about coffee we can get it in different flavor and verities like Americano, Black coffee, Café au lait, Café Breve, Caffe Latte, Café Macchiato, Cappuccino, Dry Cappuccino, Espresso con panna, Frappe, Iced coffee, Mocha, White coffee, and more. In these varieties of coffee not only flavor and taste are different but also their color and serving style are also very attractive. On the other hand, if we consider tea, hardly will we get milk tea, fresh tea, and sometimes if consumers wish they can mix themselves some lemon juice drops to make it pleasant and tasty. So in these aspects consumers were given lower rating to the tea evaluation and higher to the coffee.

Secondly, Tea is not available, if someone wants to drink coffee they can easily get it from vending machine, different types of coffee shop, in every major road-side, shopping center, crowded area, everywhere we can see different types of coffee house, for example, Starbucks, Angel-in-us, Kenya espresso, Café Mozart, Caffe Bene, not only these famous brand Coffee shops but also there are many local coffee shops are also available, like in South Korea lots of Global branded as well as local branded coffee house are available, some of them are-Hello Bene, Coffee Lab, Jeon Gwang-su COFFE HOUSE, La Caffe, Cafe Miz Moren, Coffee Factory, CBTL, Club Espresso, Addis Ababa, Chan's Espresso Bar, Republic of Coffee and many more; but in case of tea, tea is not serving in vending machine or such type of tea house. That is why attitude toward coffee was higher than tea.

Thirdly**,** there are very few or hardly to find any tea shop or tea house which can attract the consumers. And if we found any, those are not well decorated, pleasing, romantic or good times to have a cup of tea in a good environment. In contrast, in everywhere we can find different types of coffee house in very pleasant environment where people want to pass their leisure time with a cup of coffee. Interior decoration is fantastic with pleasant light, interesting photo and posters and everything is so clean. The way they serve is really enjoyable; good music, free Wi-Fi, in summer good cooling system and in winter good warming inside, even now day's students are doing their group study in this kind of coffee shops with this pleasant environment. This was another important reason for which consumers attitude not good toward tea but excellent toward coffee.

One interesting finding was t-analysis shows that there was no significant differences between coffee and tea in aspect of status but paired correlation value shows that there were some differences ($p<0.01$). Means some consumers feel that drinking coffee is more prestigious than tea. May be it was because if the environment of shop is good, serving style is attractive with different flavor then definitely it will be more prestigious to enjoy a cup of coffee than tea. But in the aspects of other two attributes there were no significant differences between Tea and coffee regarding Freshness and Habitual facts that means both sides consumers believed that they drink coffee and tea for freshness and for many consumers drinking coffee and tea is habitual matter.

Our study's main contribution to the marketing discipline relates to the consumer perception and attitude toward Coffee and Tea. Billions cups of Coffee and Tea is being consumed in everyday, it is a huge market but little attention has given in consumer or business research.

9. MANAGERIAL IMPLICATION

The overall consumers' attitude of coffee is better than Tea, for this reason Tea Company should take initiative to upgrade the consumers' satisfaction and their attitude about this product. For developing consumers' overall perception of Tea the company would take the following steps:
To extend their flavor to identify innovative distribution channel Campaign more promotional activities to extend brand image. The consumers have perceived that the Tea is not available so Tea Company should set-up vending machine and use other shopping store to make it available to the consumer. The consumer have perceived that the tea do not have different flavor so tea company must add a different type of flavor as consumer like. The consumers have also perceived that the coffee is status-full so Tea Company should take initiative to increase its status. They can improve their package, serving system; most importantly need intensive promotional activities indicating that tea is an important part of our history and tradition. The

consumers have perceived that the Tea has no any good tea shop or tea house like as coffee house, so Tea Company should setup aristocratic, and traditional and very attractive tea house. . Ready tea should be available in every where near the hand of consumer. Smell and taste of tea should be increased. On the other hand Coffee Company should maintain and improve their quality to satisfy their customers.

10. LIMITATION AND FUTURE STUDY

The limitations of the study lie in obvious limitation is the scope of the sample. It is concentrated in a particular country, so it should be replicated with samples from other countries, because like in Korean soft drink habit and other countries like India, Bangladesh will not be the same, as in those countries Tea is more available than Coffee. Another limitation is attributes, it may be varied in other countries, for example in developing or underdeveloped country cost is one the main things for purchasing decision whether they will drink Tea or Coffee.

There are some future directions that should be considered. First, why the company are not interested to serve Tea through vending machine, second if the company start to serve tea in vending machine whether consumer will consume or not, or what are the expectation of consumers?.

11. CONCLUSION

When consumers buy a product they normally consider different types of attributes which we saw the same in case of drinks item also. The product examined in this research study was Coffee and Tea. This paper focused on Korean consumers' attitudes toward Coffee vs. Tea. Korean consumers had an overall more positive attitude toward Coffee over Tea. Findings from this study should assist in filling the substantial knowledge deficit that exists regarding Coffee and Tea research in marketing or business field.

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Using Information Aggregation Markets for Decision Support

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Abstract

Information Aggregation Markets, often referred to as prediction markets, are markets that are designed to aggregate information from a disparate pool of human individuals to make predictions about the likely outcome of future uncertain events. This paper looks at how Information Aggregation Markets can be incorporated into the standard body of decision making theory. It examines how Information Aggregation Markets can be used as decision support systems, and provides empirical evidence from a wide variety of sources as to the effectiveness and practicality of Information Aggregation Markets. Finally, this paper details some future research questions to be addressed in the area of Information Aggregation Markets.

Keywords: Information Aggregation Markets. Decision Making, Decision Support Systems

1. INTRODUCTION

Organizations have always faced the problem of making decisions based on the predicted future outcome of large scale, uncertain and complex systems. For example, when a manufacturing organization needs to make a decision regarding current production priorities, its decision will be based in part on an estimation of the likely future demand for a product. An accurate prediction of demand for a product in turn involves determining the value of a product to the customer, consumer sentiment, economic factors, etc.

Two primary approaches have been identified for solving the problem of making predictions about complex systems [1]. The first approach is to develop a statistical model about the observed system that can be used to derive a prediction. However, in modelling very large and complex systems, these mathematical models are beset by a number of difficulties. Firstly, some variables are by their nature immeasurable, for example, consumer sentiment cannot be measured accurately. The number of variables that must be measured when modelling complex systems is often computationally prohibitive. It may be difficult or impossible to precisely define the nature of relationships between variables. The model maker may be completely unaware of important variables to include in the model. These factors place limitations on the accuracy that can be achieved with mathematical models.

The second approach is to identify an expert or group of experts who can make a prediction. These experts use internal models, called heuristics, and are based on an experts experience and wisdom. However, these heuristics are limited by a number of factors. Individuals suffer from bounded rationality and bounded awareness. This places fundamental limits on the accuracy and reliability of these heuristics. Also, these heuristics are usually tacit, which means they cannot be evaluated, transferred or made explicit.

Group decision making can ameliorate some of the problems associated with individual decision making. In this form of decision making, a group of individuals come together to exchange information, and make a prediction about the future outcome of an event. While group decision making can help to overcome the problems of bounded rationality and bounded awareness, group decision making structures also suffer from their own inherent limitations.

Information Aggregation Markets offer a new approach for making predictions. Information Aggregation Markets use a market to aggregate the opinions of a diverse pool of individuals. The assumption is that the market will cancel errors, while preserving and enhancing the accurate components of individual predictions. In this way, Information Aggregation Markets can provide accurate predictions about the future outcomes of large, complex, systems.

Information Aggregation Markets have already been used successfully in a number of areas. The two best known applications are opinion poll replacement and sports betting. This paper will look at how Information Aggregation Markets can be integrated into traditional decision making theory. This paper will also look at empirical evidence regarding the performance of Information Aggregation Markets. Finally, this paper will detail further research that the authors propose to undertake.

2. INDIVIDUAL DECISION MAKING

2.1 Classical Decision Making

Decision making is usually portrayed in the literature as the process of identifying a problem or opportunity, identifying alternative courses of actions, choosing between these alternatives to solve the problem or exploit the opportunity, and finally implementing the decision taken [2], [3], [4].

The classical decision making model describes an "economic" man who consistently makes decisions that are optimised with respect to the decision makers preferences with regard to consequences [4]. March and Simon present the following description as a model of how decision making occurs according to classical theory [5]. Classical decision making starts with the assumption that the decision maker has available to him the complete set of alternatives the actors from choose from in the given situation. Additionally, each of the possible alternatives has a set of consequences attached to it, which is to say the state of the world that will be instantiated given that the decision maker selects a particular alternative. The decision maker is also assumed to have a utility function which ranks consequences from most to least favorable. Thus decision making is conceptualized as the selection of the alternative that leads to the most favorable consequence as ranked by the decision maker's utility function.

This classical model of decision making contains a number of assumptions. The model assumes that the decision maker has perfect knowledge of the state of the world. It also assumes the decision maker has perfect knowledge of the set of alternatives to choose from.

2.2 Limitations on Decision Making

Research has shown that classical decision making model is limited in describing how decisions are actually made [5]. Cognitive, psychological and emotional limits are part of the human condition, and so must be taken as a given. It is not possible for an individual to have perfect knowledge of the state of the world or the set of available alternatives.

Simon points out that knowledge of possible consequences is always fragmentary, that the value assigned to future outcomes is always unknown and can only be estimated, and that humans will only ever be able to conceive of a limited set of responses or alternatives to any situation [4]. Bazerman tells us human rationality is very limited and bounded by the situation and by human computational powers [6].

2.3 Bounded Rationality

March and Simon present the concept of bounded rationality to describe some of the ways that the classical theory of decision making falls short of being a completely descriptive theory of decision making [5]. They introduce the concept of satisficing, and distinguish an optimal alternative from a satisfactory alternative. An alternative is optimal if "there exists a set of criteria that permits all alternatives to be compared, and the alternative in question is preferred, by these

criteria, to all other alternatives."

An alternative is satisfactory if "there exists a set of criteria that describes minimally satisfactory alternatives, and the alternative in question meets or exceeds all these criteria."

They describe human decision making as the process of evaluating an alternative to see if it is satisfactory or not. If it is satisfactory, then the alternative is selected, and the search terminates. If it is not satisfactory, then the search continues with the generation and evaluation of another alternative.

They also introduce the concept of a heuristic, which is defined as a rule that guides the search for alternatives.

The use of satisficing and heuristics by human decision makers inevitably leads to suboptimal decisions. Using the model outlined earlier, these phenomenon reflect a failure by the decision maker to identify available alternatives, and choose between these alternatives based on the expected consequences.

2.4 Bounded Awareness

Another phenomenon which can affect decision making is bounded awareness. Bazerman refers to bounded awareness as "cognitive blinders [which] prevent a person from seeing, seeking, using or sharing highly relevant, easily accessible and readily perceivable information during the decision making process" [7]. Put in terms of the classical model outlined above, this can be seen a cognitively limited individuals inability to have complete knowledge of the state of the world.

Bazerman and Chugh point out that bounded awareness can be caused by inattentional blindness, which is a failure to see easily identifiable information. For example, one experiment presents a video tape of two visually superimposed basketball teams, one wearing light coloured shirts and the other wearing dark coloured shirts. Participants in the experiment were asked to count the number of passes made between the two teams. To excel in this experiment, participants needed to pay close attention to the videotape. Yet, only 21% of the participants noticed a woman walking through the players carrying an open umbrella [8].

Bazerman and Chugh also point out another example of bounded awareness, which is the failure to seek information. This occurs when a decision maker intentionally or unintentionally does not seek out all the relevant information related to the decision [7]. They offer the example of the Challenger space shuttle disaster as an example of a decision making process which was flawed because the executives determining whether or not to launch did not seek information on the performance of the O-ring on the shuttle under the temperature regime that the launch would occur in.

The failure to seek information can be particularly dangerous when the decision maker has a conscious or subconscious bias towards a particular outcome, which may lead them to ignore information that contradicts or invalidates the decision that they wish to make.

Bounded awareness is also caused by a human decision maker not having access to information that may be critical to making a decision. The decision maker may be unaware of the existence of relevant information due to their incomplete knowledge of the world.

3. GROUP DECISION MAKING

3.1 Introduction to Group Decision Making

Group decision making refers to situations where the activities such as the identification of alternatives and the selection between competing alternatives are conducted by a group of people, rather then a solitary individual. Shaw offers the definition of a group as "two or more people who are interacting with one another in such a manner that each person influences and is

influenced by each other person" [9]. Many definitions of the term group exist. They generally share the some or all of the following characteristics. Firstly, members of a group share something in common. Groups may share a common motivation or goal. Groups may share a common fate, based on the consequences of the decision(s) that they make [10].

Group decision making means that additional factors enter the decision making process. In particular, the interaction of humans within group decision making situations means that additional social and psychological factors come into play. Issues such as power structures within a group and peer pressure to conform to group norms are important determinants in group decision making. Hitt, Black and Porter describe how using groups impacts on the decision process [2]. They suggest that in establishing alternatives, groups are typically superior to individuals. Similarly, in evaluating alternatives, group judgement is often superior to individual judgement because of the greater range of views and opinions that are considered. Group decision making leads to decisions having greater legitimacy, and thus being more acceptable. However, they also point out that individuals are better at implementing decisions, as individual responsibility is more likely to prompt action.

The above list identifies the two key impacts of group decision making. Firstly, a group decision making process tends to lead to greater approval and acceptance of the decision that is taken. Black and Gregersen showed that participation in the decision making process leads to greater employee satisfaction and improved performance [11]. They also showed that the greater the participation, the greater the improvements in satisfaction and performance. An individual who is part of a group tends to assimilate the goals of that group due to group pressure. Group pressure is created by identification with the group, uniformity of group opinion and group control over the environment [5].

Group decision making impacts positively on the actual process of formulating a decision itself. Using a group to make a decision increases the total amount of information available to solve the problem. The group as a whole has a greater cumulative knowledge of the state of the world then any of the individual members of the group. Similarly, a group's cumulative knowledge of the set of alternatives to be chosen should be greater than any one individual. Finally, a group should be better at choosing between the alternatives available. Assuming each person in a group makes a decision that is partly correct, and partly incorrect, provided the "incorrect" component of each individual's decision is independent of every other persons "incorrect" component, then the incorrect components should cancel or at least mitigate each other.

3.2 Combating Bounded Awareness

Bounded awareness refers to an individual having insufficient information available to them to make a correct decision. Human individuals are limited to their intellectual and information processing capabilities. As a general rule, groups have access to more information then any one individual can. Tiernan, Morley and Foley tell us that "Groups generally facilitate a large pool of information to be processed" [3]. Hitt, Black and Porter argue that "groups can accumulate more knowledge and facts" [2]. Ellis and Fisher tell us that individuals may lack "the required knowledge or ability to solve the problem", and contrast this with groups which can "draw on the available pool of information and talent" [10].

These authors make the same point. Group decision making allows information aggregation to occur. This information aggregation gives the group, as a whole, access to more information then any of the individuals comprising the group, and therefore provides the group with a superior knowledge of the state of the world and the set of available alternatives.

3.3 Combating Bounded Rationality

Bounded rationality refers to an individual's use of heuristics and satisficing over an objective utility function to choose between available alternatives. Under certain circumstances, group decision making can ameliorate the effect of bounded rationality. Ellis and Fisher point out that groups tend to perform better as the complexity of the task increases, which is equivalent to

saying as the number of alternatives to be chosen between rises [10]. They argue that this is the case because groups have access to more talent then individuals. A group may contain persons who are knowledgeable in an area that is of direct relevance to the problem being solved. They also point out that groups have a greater capacity to store and process information.

Ellis and Fisher also point out that groups are better at judgment decisions than individuals [10]. This is particularly the case where clear answers and clear rules on how to make a decision do not exist. These situations tend to rob an expert of many of her advantages. In situations where a number of alternatives exist and a value judgment has to be made to choose between them, groups generally outperform individuals.

A final area where groups tend to have an edge over individuals is in creatively developing new alternatives to meet challenges. Creativity is stimulated by interaction with others, which can lead to the generation of novel alternatives [10], [3].

3.4 Disadvantages of Group Decision Making Structures

The nature of group decision making is that it is a social interaction as well as a decision making process. The presence of interacting individuals inevitably adds complicating factors, which can have an adverse effect on the decision making process.

Some of the problems that are known to occur as a result of the social interactions involved in group decision making include groupthink, information cascades, group polarization and escalating commitments. [10], [2], [9], [3]. These disadvantages in group decision making can counteract the advantages group decision making has over individual decision making.

4. GROUP DECISION MAKING STRUCTURES

The simplest form of group decision making structure is the committee. A committee is a group of people who are assembled for the purpose of making a decision. The ways of forming such committee are many and varied.

- The committee may have a hierarchical structure, such as a chairman or some other person, or alternatively all member of the committee may be equal.

- The committee may have formal rules, such as points being made through the chair, or observing formal parliamentary rules or individuals may contribute to the discussion in an ad hoc and informal manner.

- The group may use advocacy, where the participants present alternatives to a single decision maker, or it may use a democratic process, where the group decides upon a course of action using some form of voting.
- The group may seek universal consensus, or it may use simple majority voting.

The above are just some of the ways that a committee can seek to make its decision. Committees offer the advantages for group decision making that are outlined above. However, a committee group decision making structure is also vulnerable to the problems outlined in Section 3.4. In order to minimize the social effects which cause problems in group decision making, a number alternative structures can be used in group decision making.

Brainstorming: Brainstorming focuses on the alternative generation phase of decision making. The goal of brainstorming is to “facilitate the development of creative solutions and alternatives” [3]. The key point to note is that brainstorming is only concerned with generating alternatives. It does not involve evaluating these alternatives or choosing between them [2]. The idea of brainstorming is to minimize criticism so that creativity is encouraged. By making the creation of alternatives rather than the search for consensus the primary goal of the group, brainstorming seeks to overcome groupthink.

Nominal Group Technique: Nominal Group Technique (NGT) is another group decision making structure. NGT consists of four phases [2]. First, individual members of a group silently and independently generate an alternative course of action. Next, each individual presents his or her idea to the group, without any discussion. After all the individuals have presented their ideas, a round robin discussion to clarify the ideas occurs. Finally, each individual silently and independently ranks the alternatives. The alternative is chosen by the pooled outcomes of the individuals' rankings.

NGT seeks to minimize the amount of discussion and interaction that occurs within a group. Reducing interaction and discussion should in turn reduce the effects of groupthink and reduce the likelihood of information cascades. At the same time, it should allow for at least some information aggregation to occur, during the presentation and question-and-answer phases.

Delphi: The Delphi method is even more concerned with removing the effect of social interaction on the group decision making process. When the Delphi method is used, participants never even physically meet. Instead, all group communications are mediated through questionnaires [12].

The three structures outlined above all attempt to impose a structure on group decision making that seeks to counteract the drawbacks and problems that are caused by social interactions, while at the same time allowing information aggregation to occur. Brainstorming seeks to remove the competitive element that enters any human interaction, by "accepting" all alternatives. Nominal Group and Delphi seek to limit the interaction that occurs between participants. Delphi seeks to ensure that even non-verbal cues and reputation issues do not affect the decision making process.

5. INFORMATION AGGREGATION MARKETS

5.1 Introduction to Information Aggregation Markets

A market is "a set of arrangements by which a buyer and seller are in a contract to exchange goods and services [13]. In a market, demand is the quantity of a good a buyer will purchase at each conceivable price, while supply is the quantity of a good sellers wish to sell at each conceivable price. The concepts of supply and demand lead us to the concept of an equilibrium price, which is the price of the good where the supply equals the demand.

The definition of a market above, which includes the concept of an equilibrium price, implies that information aggregation occurs in a market. All the information that is available to all the participants in a market with regards to the demand and supply of a product is aggregated into a single equilibrium price [14]. This is an example of information aggregation.

Hayek proposes two further attributes of markets. He states that markets operate as "near perfect transmitters" of information, and that markets could communicate with all the participants in the market instantaneously [15].

The two principles above led to the development of the "efficient markets hypothesis", which proposes that markets can aggregate and disseminate new information almost immediately [16].

Malkiel [16] points out that questions are continuously being raised about the efficient markets hypothesis. He cites events such as the spin off of Palm by 3Com and the technology bubble of the late 1990s as an example that markets do not assimilate all available information correctly and instantaneously. However, he answered these critics by showing that managed mutual funds do not perform any better than a simple index linked fund on average. The clear implication here is that even if markets do not aggregate information perfectly, they certainly outperform any existing model or individual.

Rather then viewing markets as instruments to distribute capital or share risk, some researchers have now begun to view markets as mechanisms for aggregating information. Markets which are designed to aggregate the markets participants' information about future events of interest are referred to as Information Aggregation Markets, although a number of other terms are used in the literature, including prediction markets, decision markets, electronic markets, virtual markets and idea futures [19].

No commonly agreed definition of an Information Aggregation Market has yet emerged. Berg and Rietz define an Information Aggregation Market as being a market "run for the primary purpose of using the information content in market values to make predictions about specific future events" [17]. Spann and Skierra describe it as being a market that allows a group of participants trade shares in virtual stocks, where "the stocks represent a bet on the future outcome of future market situations and their value depends on the realization of these market situations" [24]. Wolfers and Zitzewitz see them as being "markets where participants trade in contracts whose payoff depends on unknown future events" [18]. The definition preferred here is "Information Aggregation Markets are defined as markets that are designed and run for the primary purpose of mining and aggregating information scattered among traders and subsequently using this information in the form of market values in order to make predictions about specific future events." [19].

5.2 Information Aggregation Markets as Group Decision Making Structures

As pointed out previously, group decision making tends to outperform individual decision makers in certain situations because group decision making allows for information aggregation to occur. By allowing information aggregation to occur, Information Aggregation Markets offer the same advantages that group decision making techniques offer in terms of combating bounded rationality and bounded awareness.

When compared with group decision making techniques, Information Aggregation Markets also offer some advantages. When using an Information Aggregation Market, all information is transmitted through the medium of a share price, thus reducing the effect of social interactions that can otherwise affect group decision making structures.

Finally, as Plott and Chen point out, many business problems "share the following characteristics: small bits and pieces of relevant information exists in the opinion and intuition of individuals who are close to an activity. … In many instances, no systematic methods of collecting system information exist." [20] They move on to argue that while very little may be known by any one individual, the aggregation of the bits and pieces of information may be considerable. Information Aggregation Markets may offer an approach for efficiently gathering this information together and aggregating it.

6. INFORMATION AGGREGATION MARKETS IN PRACTICE

One of the most well-known and long running examples of an operating prediction markets is the Iowa Electronic Market (IEM). The IEM is a real time futures market in which contract payoffs depend on the results of economic and political events such as elections. The IEM was originally set up in 1988, and since then has been noted for delivering a series of predictions on the outcome of the US presidential elections, which were more accurate then opinion polls.

Joyce Berg and Thomas Rietz are two directors of the IEM. In their 2006 paper "The Iowa Electronic Markets: Stylized Facts and Open Issues", they offer a description of the IEM as being a "real-money, small scale futures market that focuses on the information revelation and aggregation roles of market prices, rather then on their role in determining allocations". The IEM is best known for its political markets, which attempt to aggregate information in order to create a prediction of the outcome of future political events, but also offers markets in a wide variety of other topics, such as legislative processes, international relationships, economic indicators, and many other topics.

Research has shown that the IEM is accurate, both relatively to the next best alternative (i.e. in the case of elections, opinion polls) and absolutely. The average absolute percentage error for presidential eve contracts is 1.33 percent. Further analysis shows that the IEM prices are closer to the actual election vote share in 76 percent of the cases [21].

Prompted by the success of the IEM, a large number of other prediction markets have been founded. Examples covered in the literature include:

Trading Exchanges: Tradesports is an Irish online trading exchange which was founded by John Delaney in 2000 [22]. In 2005, it was reported to have over 50,000 members and an average monthly volume of four million trades. It allows participants to speculate on the outcomes of future events in sports. Another example of a commercial prediction market in sports betting is offered by Betfair. In a similar vein, Newsfutures and Foresight exchange also allow users to participate in markets on the future outcome of sporting events. However, whereas Tradesports and Betfair offer markets using real currency, Newsfutures and Foresight allow participants to trade in virtual currency. [18]

Schreiber, Wolfers, Pennock and Galebach performed an analysis comparing the predictive power of Tradesports with that of Newsfutures. The authors demonstrated that both markets consistently outperformed the average investor at predicting the results of American football games [23].

Virtual Stock Markets (VSMs): Another application of Information Aggregation Markets is to gather information on the future performance of private sector returns. For example, the Hollywood Stock Exchange (HSX) allows people to use virtual currency on movie related questions such as opening weekend performance, total box office take, and who will win Oscars [18]. This information is beneficial to film studios, distributors and cinemas. Other examples of these VSMs include the Chart and Movie Exchange, which is used to track music single and album sales. Additionally, these VSMs could be used as tools to identify participants who are particularly good at making predictions. Researchers also posit that these VSMs could be used as early warning systems or “trend scouts” that could identify emerging trends within an industry or industry segment [24].

Spann and Skiera [24] performed an analysis of the HSX, which demonstrated that the market was able to consistently match or beat experts in predicting the outcome of the various events outlined above.

Internal Business Planning: A number of companies, including Microsoft, Google, and Yahoo have recently begun experimenting with using Information Aggregation Markets to improve internal decision making and prediction. Siemens created an internal Information Aggregation Market which predicted that it would be unable to complete a software project by a particular date, though standard modeling tools suggested otherwise. The Information Aggregation Market was proven correct.

Hewlette Packard (HP) are also heavily involved in using prediction markets. In 1996 Plott and Chen compared predictions for printer sales made by HP’s internal models against those made by a prediction markets. In six out of eight tests, the prediction market outperformed HP’s internal business models [20]. Plott and Chen also showed that the probability distributions calculated from market prices were consistent with actual outcomes [20]. Leading on from this, HP have developed the BRAIN process, which is a large scale program aimed at integrating a modified Information Aggregation Mechanism into their decision making structures.

Other examples of Information Aggregation Mechanisms being used in industry include markets on the future readings of economic statistics launched by Goldman Sachs and Deutsche Bank. Passmore offers the possibility that Information Aggregation Markets can be used to support Human Resource and other organizational functions. [25]

A number of authors including Hahn [26] and Hanson [27] conclude that Information Aggregation Markets could be used to help inform public sector decision making and legislation. However, the fate of the Policy Analysis Market, which was cancelled in 2002 after members of the United States Congress accused it of offering a way of betting on the possibility of future terrorist events, offers a warning that large scale use of prediction markets in such situations may not be easy. Additionally, the recent laws passed in the United States prohibiting online gambling raise questions as to the legality of operating Information Aggregation Markets in the United States. For example, Tradesports has been forced to cease operations in the United States, since its modus operandi violates the new law.

7. CONCLUSIONS AND FURTHER RESEARCH

This paper has argued that Information Aggregation Markets can be used as tools to support decision making within an organization. By showing that the information aggregation that occurs in group decision making is similar to that which occurs in Information Aggregation Markets, this paper supports the premise that Information Aggregation Markets can be used for decision support within organizations. Information Aggregation Markets use the mechanism of a share price to allow information aggregation occur, which may be less vulnerable to the social effects which affect other group decision making structures.

Empirical evidence has been provided from a large number of sources demonstrating the efficiency of currently operating Information Aggregation Markets.

The authors believe that further research in the area of Information Aggregation Markets should be pursued. Much research remains to be done in the area of the design of Information Aggregation Markets. In the context of this paper, the authors believe that one important research question is how managers will view Information Aggregation Markets as decision support systems. While most decision support systems are transparent, and show how a decision is reached, Information Aggregation Markets are opaque. Little or no information is available as to how a market reached a consensus as a price. This lack of transparency may raise barriers to the acceptance of Information Aggregation Markets as decision support tools, and requires further investigation.

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