Chapter-5 The Problem Hypothesis

The profile of Internet users in India is dominated by:-

- The professional/corporate segment, which accounts for around 43 per cent of Internet usage.
- Inching close behind is the student community represented by school and college goers. This segment contributes close to 38 per cent of Internet surfers.
- Over half (59.2 per cent) use the Internet as an information resource, 11.3 per cent use it as an educational tool and just under 8.2 per cent use it for entertainment.
- When asked what are the most frequently used services online, 73.4 per cent answered e-mail, 77 per cent answered search engines and 23 per cent said they use it for downloading/uploading software.
- Of the total Internet users, around 20 per cent own credit cards and around 14 per cent own mobile phones.

According to the NASSCOM survey, considering the interest the Government is taking in the growth of the market, e-commerce in India will witness a significant jump over the next three years.

IT companies

Some of the preliminary findings on e-commerce/e-business software exports potential are as follows:

- In the year 1999-2000, Internet and e-commerce related software and services export from India brought in US$ 500 million out of an estimated US$ 4 billion software and services exports.
- Supply Chain Management optimization is one of the strongest drivers of the global e-commerce solutions market, as it spurs business-to-business transactions. More than 68 per cent of Indian software houses have informed of strong expertise in supply chain and distribution management solutions.
- Almost 32 per cent of IT company respondents have identified web based consumer business as a major opportunity area, with expected paybacks beginning in three to four years.
Some of the emerging hot areas of e-commerce services are: legacy application integration; Internet application integration; Customer Relationship Management (CRM), Customer Service Management (CSM), Enterprise Resource Planning (ERP) and Electronic Data Interchange (EDI) migration to web based models; new IT frameworks and integration with business strategy (strategic IT consulting); e-commerce training services, business web site development and maintenance. The user side, e-commerce means business. Some of the highlights of the domestic e-commerce scenario based on the findings of NASSCOM’s survey include the following:

- Among user organizations, more than 90 per cent expressed keen awareness about the increasing adoption of e-commerce and its potential benefits.
- More than 55 per cent of corporate respondents said that e-commerce transitions were integral of their corporate plans. Of these nearly 85 per cent were industries which did not have direct or frequent contact with end consumption.
- About 23 per cent of top 500 companies in India already have started some form of e-commerce. These have been facilitated through the up-gradation of existing IT systems or fresh installations configured or e-commerce transactions.

Today E-commerce is a byword in Indian society and it has become an integral part of our daily life. There are websites providing any number of goods and services. Then there are those, which provide a specific product along with its allied services.

(A) MULTI-PRODUCT E-COMMERCE:
Some Internet portals provide almost all categories of goods and services in a single site; hence, they are targeting buyers of every possible product/service. The most popular examples are www.indiaplaza.com, www.thebestofindia.com, www.khoj.com, www.sify.com, www.rediff.com, www.indiatimes.com and so on. These Indian E-commerce portals provide goods and services in a variety of categories. To name a few:

1. Apparel and accessories for men and women
2. Health and beauty products
3. Books and magazines
4. Computers and peripherals
5. Vehicles
6. Collectibles
7. Software
8. Consumer electronics
9. Household appliances
10. Jewelry
11. Audio/video entertainment goods
12. Gift articles
13. Real estate and services
14. Business opportunities
15. Employment
16. Travel tickets
17. Matrimony
18. Pets…and more.

B) SINGLE-PRODUCT E-COMMERCE:

Some Indian portals/websites deal in a specialized field, for example:

1) Automobiles:

On these sites we can buy and sell four-wheelers and two-wheelers, new as well as used vehicles, online. Some of the services they provide are:

- Car research and reviews
- Online evaluation
- Technical specifications
- Vehicle Insurance
- Vehicle Finance
- Dealer Locator
- Regional Transport Office regulations
- Expert speak
- Message board…and more.
2) Stocks and Shares And E-Commerce:

In India today, we can even deal in stocks and shares through e-commerce. Some of the sites are: http://www.equitymaster.com/ and www.5paisa.com/. Some of the services offered to registered members are:

- Online buying/dealing of stocks and shares;
- Market analysis and research
- Company information
- Comparison of companies
- Research on Equity and Mutual Funds
- Tracking Market Trends
- Hotline for advice on Risk Management
- 24-Hour helpdesk…..and more.

- Currently E-Commerce is synonymous with PC and browser-based interaction. However, in the near future GPRS-enabled mobile phones will rule the online transactions. Today, online downloads to mobile phones is limited to low value services like music downloads, picture message downloads and ringtone downloads. However, as the mobile users get more familiar with buying online, the purchase of high-involvement products is expected to rise. Certain verticals like Banking and Finance, Travel, Entertainment, and Retail are likely to drive the growth of m-Commerce in the country. In the recent past, E-Commerce and it variants like the m-Commerce have yearned for the position of being the most important drivers of the Internet. They are continuously evolving and upgrading to make a consumer’s e-Spending experience hassle free and memorable. However, to attain that position, it needs to awaken its inner beauty – simplicity and security of transaction.

- E-commerce is still in its nascent stage in India. However, smart companies are realizing that e-commerce offers cost effective, time saving and profitable solutions in many functional areas. Though companies have taken a long-term perspective, e-commerce would eventually be the way Indian companies also conduct business.

Browser and Risk Based Testing
This chapter provides a high level overview of browser-based testing concepts that are related to the topic and goal of this thesis. Internet Explorer, Mozilla FireFox, Google Chrome, Opera are the most common browsers and there are so many other browsers are in the market. Every browser has its specialties and limitations, own settings for handling web pages and security. So while developing an application one has to be very much careful about compatibility with different browsers, about security of the application and seriously consider the pitfalls of browser-based applications.

Fig 3.1 Various browsers

Same web page may look different depending on different browser even what version of the browser. In some cases a web page do not work properly in old version of a particular browser. So it should also be checked that the web page may work fine with an older browser but not a newer one.
The developers of browser-based applications have to make sure their user interface works with multiple browsers and versions of those browsers. This means it takes more time to develop and test each new feature, and every time a new version of a browser comes out this problem becomes worse.

One more feature that needs to be tested is the issue of performance. Web-based applications totally depend on internet or intranet to work by sending data. This mode of communication is relatively slow compared to network speeds and when the database becomes large there will be performance problems with many web-based applications. Though this problem can easily be resolved by developing a web-client applications which by caching data on the client computers solve performance problems caused by data transmission. Browser based applications can do some caching too, however, the cached data is generally stored in RAM and lost when the browser is closed. So many applications have been developed to store cache even after browsers are closed and it should be checked carefully that which data are kept by such clients and are they stored securely or not.

Broadly we can divide the testing in following six steps:
• Risk Identification
• Risk Strategy
• Risk Assessment
• Risk Mitigation
• Risk Reporting
• Risk Prediction

**Risk Identification**
This step is probably the most relevant step as far as this thesis is concerned because it tries to answer questions such as:
What are the risks with web browser applications?
How can it be classified?”
This thesis through its taxonomy and collection of failure modes (risks) tries to provide the foundation for determining the answers to the above question.
Amland defines this risk identification “as the process of collecting information about possible risks to the application and classifying it to determine the amount of potential risk in the test phase and in production (in the future).”

I think that a tester or a group of testers who is performing the risk analysis for their e-commerce site must look for information about potential risks from the taxonomy and its collection of more than 700 failure modes. The failure modes are essentially a collection of possible risks to the system. The testers might find out some other possible failure mode apart from the list and get identify to come up with a similar risk they think their system might face.

**Risk Strategy**

As per Amland "Risk based strategizing and arranging includes the recognizable proof and evaluation of risks and the improvement of emergency course of actions for conceivable option venture movement or the relief of all risks." (Amland 1999)

While making methodology the analyzer needs to plan systems or arrangement decided to realize a wanted future, for example, accomplishment of an objective or answer for an issue. The analyzer tries to recognize the likely risks that may influence the application antagonistically and prioritize what they think are the basic risks. In this proposition, a rundown of e-trade risks will give them a diagram of numerous sorts of risks can emerge. In the wake of getting rundown of plausible risks, analyzer needs to mastermind them in basic and high hazard to low risks. Discriminating/High Risks ought to be set in their need rundown while low risks can be put in non-need. Extortion risk is ascertained focused around numerous information calculates and appointed a numerical score for every exchange. The scores, which serve as relative risk markers, focus "next steps" for that.

"As a result of the risk innate in a CNP exchange environment, numerous shippers have endeavored to create complete methods for discovering and forestalling misrepresentation. With the right devices and innovations, shippers can apply these methodologies to securely lead business online without just tolerating misrepresentation as an "expense of working together."
As of not long ago, a considerable lot of the best hazard appraisal and misrepresentation administration arrangements were composed and focused on just towards bigger vendors despite the fact that shippers of all sizes are similarly powerless. Indeed, vendors with littler deals volumes can be at much more serious hazard because of relative naïveté in misrepresentation recognition and an absence of devoted extortion administration assets. Luckily, compelling apparatuses and innovations for extortion administration are currently accessible and reasonable for dealers of all sizes.³

Misrepresentation methods are continually advancing, and new information ruptures are accounted for consistently disregarding a feeble economy, one business fragment ecommerce—has kept on experiencing huge development. In 2009, ecommerce deals developed by 5.5 percent, to $205 billion. As indicated by Javelin Strategy & Research, online retail deals are required to increment by an alternate 13 percent in 2010.¹

Despite the fact that ecommerce misrepresentation rates have balanced out as of late due, to a limited extent, to retailers' expanded vigilance—in 2009 vendors still lost $3.3 billion to online fraud.²

**Risk Assessment**

According to Amland in his topic Risk-based testing metrics “Risk based strategizing and planning involves the identification and assessment of risks and the development of contingency plans for possible alternative project activity or the mitigation of all risks.”(Amland1999)

This step involves determining the consequences if this particular function fails. It involves calculation of loss that may arise after failing a function or program as a whole. What cost needed to be paid to whom it effects wiz to customer, to programmer, to Banker or to Government.

To provide an organisation with a clear understanding a risk assessment should be carried out, so that it can be confirmed that e-commerce system is working properly and it should also be checked that its associated business processes are also working properly. The system should be designed in such a manner that if any security incident arises it can be identified easily.

A key part of risk assessment is defining business. This will cover the rules of access for different groups of users. We can also say that different rules can be applied for different group
This step can be said to be similar to the effects analysis section of FMEA (Failure Modes and Effects Analysis) which is discussed in detail in the next chapter. This thesis provides causes of e-commerce failures in its taxonomy, valuation of loss that may arise, its overall impact and how to safeguard from such risks.

**Risk Mitigation**

Risk mitigation in e-commerce means reducing the impact of failure in its taxonomy so that in case any failure arises the loss can be minimized and rectified easily.

"Hazard alleviation includes taking some quick, ace dynamic venture to decrease the likelihood or the effect of the risk" as characterized by Rational's Unified Process. Making a group of exceedingly qualified experts (analyzers) which persistently screens risks to the frameworks. Setting up reviews time to time is an alternate method for alleviating risks. The analyzers may concentrate all the more by distinguishing high-hazard works and getting on them to diminish the effect of failure when it happens. Amid the assessment, analyzers discover an example of higher event in the failures for a few capacities, choose to allot them to the rundown of "high-hazard capacities," and outline tests that focus on these capacities all the more altogether.

**Risk Reporting**

This step includes making a report of data found in the past steps. This incorporates characterizing them according to level of risks. Paul's (Gerrard 2002) article on stickyminds.com, 'Risk Based Test reporting‘ is a great article to peruse all the more about risk reporting.
He composes assume we have done a risk investigation and all tests for all test stages are identified with a risk. We can clearly say toward the beginning of framework test execution say, that none of the test goals have been met. Since test goals all identify with a solitary risk, we can along these lines say: At the beginning of test execution, we assume that all the risks to be tended to by this period of testing still exist.

That is, all known item risks are remarkable. With this presumption, we are stating that the framework is "liable until demonstrated pure" or put an alternate way, the framework is completely unsuitable. This is evident maybe, yet why is this imperative? On the first day of testing, we can say, "we have run zero tests, here are the remarkable risks of discharge". As we advancement through the test arrange, one by one, risks are cleared as all the tests that address each one risk are passed. Partly through the test arrange, the analyzer can say, "we have run a few tests, these risks have been tended to (we have proof), here are the extraordinary risks of discharge." Suppose testing proceeds, however the analyzers use up time before the test arrangement is finished. The go live date methodologies, and administration need to judge whether the framework is worthy. In spite of the fact that the testing has not completed, the analyzer can say, "we have run a few tests, these risks have been tended to (we have proof), here are the exceptional risks of discharge." The analyzer can display precisely the same message all through the test stage, with the exception of the extent of risks tended to those remarkable increments after some time.

How does this assistance? All through the test execution stage, administration dependably have enough data to settle on the discharge choice. Either administration will choose to discharge with known risks, or pick not to discharge until the known risks (the remarkable risks that are inadmissible) are tended to.

A risk based test methodology implies that gives testing the ax does not block a sane choice from being made. It simply settles on the choice to discharge more improbable.

In the event that we distinguished numerous risks in our venture, and in an expansive, complex task you may recognize between 60-80 risks, these risks are liable to be tended to over all the advancement and test stages. In this way, the flat scale may incorporate all phases of testing, not simply framework or acknowledgement testing. As the task continues, the risks that are down to the designers to address through unit and integration testing are as obvious as those in acknowledgement. The benefit of reporting against all risks thusly is that the engineers,
framework and acceptance analyzers all see obviously the risks for which they are dependable. Administration as well, has visibility of the risks and can see risks being shut as test proof is delivered. On the off chance that test proof is not created, risks will stay open. In the event that you have issues in your association with designers doing testing seriously or not in any manner, this manifestation of reporting may sway them to test (or test better) and produce the obliged data to administration.

The advancement exercises are characterized regarding coding errands in numerous activities. Some of the time the errands are described as "code and test module XXX". That being said, we realize what engineers truly like to do. Coding gets 90% of the exertion and testing is crushed once more. To maintain a strategic distance from this, it is dependably recommend that code and test exercises in task arrangements be characterized as partitioned undertakings (here and there arranged and performed by diverse individuals), particularly at the segment level. For discriminating parts, we can archive the test destinations got straightforwardly from the risk assessment in part test arrangements. We can reference those risks on test reports sent to senior administration. In the event that supervisors pay attention to these risks, designers may give careful consideration to part testing.

Consider what may happen if, amid a test stage, a regression test recognizes a deficiency. Since the test fizzles, the hazard that this test halfway addresses gets to be open once more. The risk based test report may show risks being shut and afterward re-opened on the grounds that relapse issues are happening. The report gives an acceptable sign that things are happening – bug fixes or upgrades are creating issues. The report brings these irregularities specifically to the consideration of administration.

Stakeholders are most intrigued by the profits that are accessible and the goals that can be attained. The weight on designers is to settle the blames that square the tests. The profit based test reports show this plainly. Venture administration are most intrigued by the risks that square the profits and goals. The profits based test reports center consideration on the blocking risks so the venture supervisor can push harder to get the tests that matter through.

One last point: If analyzers present hazard and profits based test reports, the weight on analyzers is essentially to execute the extraordinary tests that give data on risk.
**Risk Prediction**

With the information collected in the previous steps risk can be easily predicted. It becomes easy to get an idea about the type of risks. It becomes easy to make accurate forecasting that Where, when and how they can occur. As per Amland, data about the history and learning of long ago distinguished risks serves to foresee hazards accurately. This postulation contains posting of in excess of 300 genuine bugs that have influenced e-business destinations. This rundown can be a profitable resource in the hands of an analyzer who is searching for verifiable information about failures that have happened previously. The analyzer can base his expectations about conceivable new risks on them.

**Risk Based Testing: Doing it the "Outside-In" Way**

James Bach composed an article titled "Heuristic Risk-Based Testing" in the STQE (Software Testing and Quality Engineering Magazine, 11/99). In this fantastic article, he recommends two methodologies to do the procedure of risk investigation – the Inside-Out way and the Outside-In way. (Bach 1999) In the Inside-Out way, the analyzer strolls through the application and does a risk investigation by soliciting a number from inquiries, for example, "Suppose it is possible that the capacity in this case falls flat. What would happen in the event that it were broken? Can this capacity ever be conjured at the wrong time?"

In the Outside-In way he recommends that you "counsel a predefined rundown of risks and figure out if they apply without a moment's hesitation." He additionally represents the methodology by utilizing the ISO 9126 standard for quality properties. The scientific categorization and the risk rundown gave in this proposition is one such predefined rundown of risks relevant to e-trade locales. The rundown is expansive, and henceforth a profitable instrument in the hands of another analyzer who chooses to pick the Outside-In methodology for risk examination.

**Summary**

In this part I have compressed the point of risk based testing and attempted to specify how it binds to the pertinence of the proposition and binds the scientific categorization to taxonomy. It has been seen how risk identification is done and after identification what strategy we should follow to minimize it. Also with risk assessment is has to be identified that in case particular
function or program fails what are the consequences and where exactly it’s going to be hit. Risk Mitigation is another good method to minimize chances of failure. Another is Risk Reporting where collected data has been summarized and a report is drawn to identify the cause of failure or the points where exactly the problem is arising from.

The Risk-based testing has the same approach in comparison to FMEA, which is the topic for the next chapter. Risk-based testing is a good testing technique to test critical functions and the time available to test is short. It increases customer confidence since all the major bugs will be caught and the chances of massive failures are low.