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**CENTER OF INFORMATION TECHNOLOGY AND SCIENTIFIC COMPUTING**

**Evolution of Internet to the World Wide Web**

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# **Introduction**

Every day, millions of people around the world use the Internet to search for and retrieve information on all sorts of topics in a wide variety of areas. The information can appear in several types of digital formats, such as text, images, audio, or video. Individuals, companies, research labs, libraries, news organizations, television networks, governments, and other organizations all make resources available. People communicate with each other, sharing information and making commercial and business transactions, using electronic mail. All this activity is possible because tens of thousands of networks are connected to the Internet and exchange information in the same basic ways. Never before has so much information from such a wide variety of sources and in so many formats been available to the public.

The World Wide Web is not the same as the Internet, but the two terms are popularly used as synonyms. The Web is the information connected or linked in a way that is like a spider’s web. Using a Web browser, the computer program or software that lets you access the World Wide Web, you can find information on almost any topic with just a few clicks of your mouse button. Several search tools (programs that search the Web for resources) are readily available. When you type a keyword or phrase into a form and click on a button or icon on the screen, a list of items appears. You simply click on the ones you want to retrieve. The amount and variety of information available are astounding, but sometimes it’s difficult to find appropriate material.

# **History of Internet**

The Internet is a vast network of computers and other mini-networks all linked together so that everyone can find information, purchase products, or meet new people. It is easily assessable from home for anyone that has a computer and a modem or at a local library. It has made a huge impact since its introduction to the public and now some people cannot see life without it. It is also relatively new considering it was just about 10 years ago that it was made public and easily accessible to everyone thorough online services.

The Internet is first conceived in the early ’60s. Under the leadership of the Department of Defence’s Advanced Research Project Agency, it grows from a paper architecture into a small network (ARPANET) intended to promote the sharing of super-computers amongst researchers in the United States. Through the next couple years there were talks of about how this network could come into the cooperate world and in 1969 researchers at four US campuses create the first hosts of the ARPANET, connecting Stanford Research Institute, UCLA, UC Santa Barbara, and the University of Utah. The ARPANET is a success from the very beginning. Although originally designed to allow scientists to share data and access remote computers, email quickly becomes the most popular application. The ARPANET becomes a high-speed digital post office as people use it to collaborate on research projects and discuss topics of various interests. In 1971 the ARPANET grows to 23 hosts connecting universities and government research centres around the country. In 1972 the Internetworking Working Group becomes the first of several standards which set entities to govern the growing network. Vinton Cerf is elected the first chairman of the INWG, and later becomes known as a “Father of the Internet.” The ARPANET goes international in 1973 with connections to University College in London, England and the Royal Radar Establishment in Norway.

From 1974 to 1981 the general public starts to get its first vague hint of how networked computers can be used in daily life as the commercial version of the ARPANET goes online. The ARPANET starts to move away from its military and research roots and in 1974 Bolt, Beranek & Newman opens Telnet, the first commercial version of the ARPANET. In 1981 ARPANET has 213 hosts and a new host was being added approximately once every 20 days.

From 1982 to 1987 Bob Kahn and Vint Cerf are key members of a team which creates TCP/IP, the common language of all Internet computers. For the first time the it seemed as though the loose collection of networks which made up the ARPANET is seen as an “internet”, and the Internet as we know it today is born. The mid-80s marks a boom in the personal computer and super-minicomputer industries. The combination of inexpensive desktop machines and powerful, network-ready servers allows many companies to join the Internet for the first time. Corporations begin to use the Internet to communicate with each other and with their customers. In 1982 the term “Internet” is used for the first time. By 1984 the number of Internet hosts exceeds 1,000, by 1987 the number exceeded 10,000, and by 1990 the number exceeded 300,000.

By 1988 the Internet is an essential tool for communications, however it also begins to create concerns about privacy and security in the digital world. New words, such as “hacker,” “cracker” and” electronic break-in”, are created. These new worries are dramatically demonstrated on Nov. 1, 1988 when a malicious program called the “Internet Worm” temporarily disables approximately 6,000 of the 60,000 Internet hosts. The Computer Emergency Response Team was formed in 1988 and it was their job to address security concerns raised by the Worm.

In 1993 corporations wishing to use the Internet face a serious problem which was commercial network traffic was banned from the National Science Foundation’s NSFNET, the backbone of the Internet, but in 1991 the NSF lifts the restriction on commercial use, clearing the way for the age of electronic commerce.

Also in 1991 at the University of Minnesota, a team led by computer programmer Mark MaCahill releases “gopher,” the first point-and-click way of navigating the files of the Internet. Originally designed to ease campus communications, gopher is freely distributed on the Internet. 1991 is also the year in which Tim Berners-Lee, working at CERN in Switzerland, posts the first computer code of the World Wide

Web in a relatively innocuous newsgroup, “alt.hypertext.” The ability to combine words, pictures, and sounds on Web pages excites many computer programmers who see the potential for publishing information on the Internet in a way that can be as easy as using a word processor.

Marc Andreesen and a group of student programmers at NCSA (the National Centre for Supercomputing Applications located on the campus of University of Illinois at Urbana Champaign) will eventually develop a graphical browser for the World Wide Web called Mosaic and by 1993 Mosaic becomes the first graphics-based Web browser.

By 1993 traffic on the NSF backbone network exceeds 1 trillion bytes per month, and the first audio and video broadcasts take place over a portion of the Internet known as the “MBONE.” More than 1,000,000 hosts are now part of the Internet and it expands at a 341,634% annual growth rate.

In 1995 NSFNET reverts back to a research project, leaving the Internet in commercial hands. The Web now comprises the bulk of Internet traffic. James Gosling and a team of programmers at Sun Microsystems release an Internet programming language called Java, which radically alters the way applications and information can be retrieved, displayed, and used over the Internet.

As the Internet celebrates its 25th anniversary in 1996, the military strategies that influenced its birth become historical footnotes. Approximately 40 million people are connected to the Internet. More than $1 billion per year changes hands at Internet shopping malls, and Internet related companies like Netscape are the darlings of high-tech investors. Users in almost 150 countries around the world are now connected to the Internet. The number of computer hosts approaches 10 million. Within 30 years, the Internet has grown from a Cold War concept for controlling the tattered remains of a post-nuclear society to the Information Superhighway. Just as the railroads of the 19th century enabled the Machine Age, and revolutionized the society of the time, the Internet takes us into the Information Age, and profoundly affects the world in which we live.

In present day people are telecommuting over the Internet, allowing them to choose where to live based on quality of life, not proximity to work. Many cities view the Internet as a solution to their clogged highways and fouled air. Schools use the Internet as a vast electronic library, with untold possibilities. Doctors use the Internet to consult with colleagues half a world away. The Internet even offers a single Global Village; it threatens to create a 2nd class citizenship among those without access. As a new generation grows up as accustomed to communicating through a keyboard as in person, life on the Internet will become an increasingly important part of life on Earth. The Age of the Internet has arrived.

# **Website Features in Different Years**

# **Categories of Website**

There are more than 1.25 billion number of websites and this number is rising at an alarming speed. Despite the sheer quantity of websites in the world today, no two are truly the same. There are many different types of websites, with each serving a different purpose, donning a different design, and coming with varying design costs. All types of websites are categorised into 12 categories: - Web portal, News, Informational, Business/ Marketing, Educational, Entertainment, Advocacy, Blog, Wiki, Social Network, Content Aggregator, Personal websites.

1. Web portal

A portal is a web-based platform that collects information from different sources into a single user interface and presents users with the most relevant information for their context. Over time, simple web portals have evolved into portal platforms that support digital customer experience initiatives. Web portal is divided into Patient Portals, Government Portals, Intranets/Extranets/Workplace Portals, Knowledge Management Portals, Student Portals, and Vendor Portals.

Web portal examples

2. News

The news is information about happenings and events, occurring right now. News can be channelled through many different media forms. You can find news in a newspaper, broadcast on the radio, or watch the news broadcast on the Television, hearing and seeing the news. You even might have experienced the news yourself and is spreading the word. Among these news outlets, you will also find a News Site. This is actually an Online Newspaper and a version of a printed paper. The Internet, or going online, created more opportunities for newspapers and independent news sites not linked to a printed version. Publishing, or Broadcasting the latest, breaking news, first, is every news outlet’s top-most priority.

A News Site uses News Reporters, or journalists, to provide them with the news. Journalists are being taught today to be able to write and shoot video that can be used for Internet news sites, as well as, the correct format used for printed versions.

But, News sites can also publish news from other sources; too, for instance, you came upon a rare bird on vacation, took a picture, and submitted it on their website. Or, you found a lost child in a shopping centre and published it online. All newsworthy events and publishable, experienced, first hand, by yourself.

News site examples

3. Informational

Informational websites are those sites which are created in order to provide a customized and branded resource for potential and active customers, members, investors and so forth. These websites are usually content and design driven.

Informational site examples

4. Business/ Marketing

A business website is an integral part of a larger marketing plan. It is therefore important to understand the role it must play. Business website is usually the cornerstone of an online marketing plan, providing a presence for your business. It’s the online equivalent of owning a high street shop or prominent office. On many occasions it is the centre of a business’ universe and is generally the place where other marketing activity is attempting to drive traffic to.

Business sites examples

5. Educational

Educational websites can include websites that have games, videos or topic related resources that act as tools to enhance learning and supplement classroom teaching. These websites help make the process of learning entertaining and attractive to the student, especially in today's age.

Educational sites example

6. Entertainment

Entertainment website is intended to entertain its visitors, so it is based on providing entertainment information, pictures, and interactive online services. You can easily spot an entertainment website by bright images, animation, entertainment information, interactive chat rooms, online games, photo galleries, drawings, audios & videos, etc.

Various entertainment websites may pursue different goals, but the main purpose is to attract visitors using bright and funny images, animation effects, and interactive services. Due to the specifics of the entertainment site, banner and contextual advertising work here quite effectively, increasing the profitability of such projects.

An entertaining site most often includes more interactive elements than many other types of websites, because millions of people visit it just to have fun and find someone to have fun with. Therefore, chat rooms and forums that involve communication between the visitors are the things that entertainment website needs.

Entertainment sites example

7. Advocacy

An advocacy website's purpose is to influence public policy and resource allocation decisions within political, economic, and social systems and institutions. It can question the way policy is administered and create awareness on an issue, but also provide a plan of action to act on what is now known.

Advocacy sites examples

8. Blog

A blog (shortening of “weblog”) is an online journal or informational website displaying information in the reverse chronological order, with the latest posts appearing first. It is a platform where a writer or even a group of writers share their views on an individual subject.

There are many reasons to start a blog for personal use and only a handful of strong ones for business blogging. Blogging for business, projects, or anything else that might bring you money has a very straightforward purpose – to rank your website higher in Google SERPs, a.k.a. increase your visibility.

As a business, you rely on consumers to keep buying your products and services. As a new business, you rely on blogging to help you get to these consumers and grab their attention. Without blogging, your website would remain invisible, whereas running a blog makes you searchable and competitive.

So, the main purpose of a blog is to connect you to the relevant audience. Another one is to boost your traffic and send quality leads to your website.

Blog sites examples

9. Wiki

A wiki is a Web site that allows users to add and update content on the site using their own Web browser. This is made possible by Wiki software that runs on the Web server. Wikis end up being created mainly by a collaborative effort of the site visitors. A great example of a large wiki is the Wikipedia, a free encyclopedia in many languages that anyone can edit. The term "wiki" comes from the Hawaiian phrase, "wiki wiki," which means "super-fast."

Wiki site examples

10. Social Network

A social networking site is an online platform that allows users to create a public profile and interact with other users on the website. Social networking sites usually have a new user input a list of people with whom they share a connection and then allow the people on the list to confirm or deny the connection. After connections are established, the new user can search the networks of connections to make more connections.

Social networking sites have different rules for establishing connections, but they often allow users to view the connections of a confirmed connection and even suggest further connections based on a person’s established network. Some social networking websites like LinkedIn are used for establishing professional connections, while sites like Facebook straddle the line between private and professional. There are also many networks that are built for a specific user base, such as cultural or political groups within a given area or even traders in financial markets.

Social networking websites are easy to confuse with social media sites. A social networking site is any site that has a public or semi-public profile page, including dating sites, fan sites and so on. A social media site has profiles and connections, combined with the tools to easily share online content of all types

Social network site example

11. Content Aggregator

Content aggregation is the automatic collection and grouping of content from multiple sources on a particular topic. All Top provides users with a variety of headlines from popular websites on different topics such as news, tech, sports, entertainment, health, lifestyle, and business. A content aggregator is a website that collects different content including news articles, social media posts, images, and videos on particular issues from around the web and makes them accessible in one place.

Content aggregator sites example

12. Personal

Personal web pages are primarily used for informative or entertainment purposes but can also be used for personal career marketing (by containing a list of the individual's skills, experience and a CV), social networking with other people with shared interests, or as a space for personal expression.

Personal websites examples

# **Guidelines for Evaluating a Website**

To evaluate the performance of an organization key performance indicators (KPIs) are important. Key performance indicators are a type of metric used to evaluate the factors that significantly impact a business’s bottom line. They differ by industry and organization, and can be used to assess many aspects of a business.

When it comes to measuring website performance, there are several KPI metrics that can be used. With so much data available, it can be overwhelming to know which KPIs to focus on. By closely monitoring the following key performance metrics, you can determine which areas of your website are doing well, vs. those areas which may need some improvement.

## **1. Measure your audience**

One of the most important things to measure on your website is your audience reach and impact. You can do this by tracking your visitors, which is typically done using Google Analytics or some other analytics tool. You’ll need to find a way to track the number of visits (Google Analytics refers to these as “sessions”), and unique visitors (Google Analytics calls these “users”), as well as to determine the number of new vs. returning visitors your website receives each day.

By measuring users and sessions and comparing your numbers periodically (monthly, quarterly, annually), you can determine if your audience is growing, and if so, how quickly (or slowly). It’s crucial to have a mix of new and returning users, though the exact percentages vary by industry, goals, and more. Returning users are a positive sign, since they indicate that people are thinking about your brand, and may be thinking about making a purchase.

## **2. Analyse your traffic sources**

In addition to tracking the number of visitors and the number of visits they are making to your website, it’s important to determine how your visitors are getting to your website. Are they coming through Google? A social media marketing campaign? A directory listing? An email blast? A pay-per-click (PPC) ad? What specific keywords are leading potential customers to your site?

Google Analytics automatically groups visitors into different categories based on demographics, geography, interests, etc., in addition to segmenting visitors by traffic channels source/medium, referrals and more. Analysing your traffic sources and audience behaviours allows you to get to know your potential customers better, and to improve your marketing techniques based on that knowledge.

Traffic sources:

* Organic – Traffic generated by relevant keywords and/or your business name
* Referrals – Traffic that comes to your site through websites that link to your site
* Direct – Traffic generated by those who type your exact URL into their browser
* Email Marketing – Traffic generated by links in email marketing campaigns
* Paid Traffic – Traffic generated by PPC search engine ads, retargeting ads, etc.
* Social Media – Traffic that comes to your site through social network links or ads.

## **3. Measure bounce rate and average session time**

Generally speaking, the longer a user spends on your site, the more likely they are to make a conversion of some sort. If a person visits your site and then immediately leaves (bounces), it is unlikely that they found what they were looking for, or that they will return to make a purchase or convert in some other way.

For example, if a business or consumer is looking for a specific medical device that you sell, and they arrive on your website through a digital ad, email marketing campaign or keyword search, they will be expecting to find that medical device relatively easily. If your medical device website is optimized for the most relevant industry keywords, then users are less likely to leave quickly or bounce.

As long as your website is relevant, user-friendly, and easy to navigate, a user will likely stay for longer, and may view several pages on your site. They may not make a purchase right away, but the longer you are able to keep them on your site, the more likely they are to eventually make a purchase. In addition, lower bounce rates and longer session’s times increase your search engine ranking statistics with Google, which increases the likelihood of your website being found.

## **4. Measure conversion rates**

Now that you have an idea of how many users are visiting your site, how many times they are visiting, where they are coming from, and how long they are staying, you need to determine what they’re doing once they get there. Are they signing up for your newsletter? Downloading content? Requesting a quote? Sending a message? Or not taking any action?

Getting people to your site is half the battle. In order to increase conversion rates, you need to have clear call-to-actions (CTA) on your site in the places where people are likely to look for them. Using the medical device industry as an example again; if you have a page focused on the benefits of a particular medical device, you may want to encourage visitors to “Learn More”, “Request a Quote”, “Contact Us”, or “Download” content, such as an e-Book or whitepaper.

## **5. Measure profits and ROI**

Determining the cost of your conversions and your overall return on investment is perhaps the most important KPI of all. If you’re spending more to get conversions than you are receiving in profits, then of course you have a problem. Then again, maybe you’re just breaking even. By measuring and analysing all of the other KPIs for your website listed above, you can learn how to increase your overall profits by adjusting the results of these performance metrics.

By measuring and analysing the KPIs, it becomes easier to determine what areas of your website are functioning better than others. Make sure you are aware of some common KPI warning signs. With the right website performance tools and/or team of professionals, it makes tracking and analysing your data simple.

Measurement of some websites

1. www.facebook.com

Facebook is a social media website that helps users share information with each other or communicate with each other. Facebook have 2.5 billion users world-wide that is 70% of all internet uses. Facebook users use all of the traffic sources mentioned above in the guidelines to invite as many people as the can to Facebook. There are more than 50 social media website in the world. Average people spend 2 hours and 33 minutes in this social media, Facebook takes 50 minutes or 33% of this time. Facebook have 9.2% of conversion rate. In 2019, Facebook's revenue amounted to 70.7 billion US dollars. Overall Facebook is in a good track.

2. www.youtube.com

YouTube is a video sharing service where users can watch, like, share, comment, and upload their own videos. The video service can be accessed on PCs, laptops, tablets and via mobile phones. YouTube have 1.3 billion users world-wide and 30 million daily users that is 30% of all internet users. YouTube users use all of the traffic sources mentioned above in the guidelines to invite as many people as the can to YouTube channels or a single video in YouTube. People now watch one billion hours of YouTube per day. There are 3.4 billion internet users which means in average 17 minutes per internet user. YouTube have 14% of conversion rate. People comment, subscribe, and do many other interactive activity in YouTube. In 2019, YouTube's revenue amounted to 15 billion US dollars. Overall YouTube is a video sharing website which makes it a little bit difficult to share information because video occupies a larger memory space than other file formats such as texts.

3. www.amazon.com

Amazon.com is an American multinational technology company based in Seattle that focuses on e-commerce, cloud computing, digital streaming, and artificial intelligence. It is considered one of the Big Four tech companies, along with Google, Apple, and Facebook. It's been referred to as "one of the most influential economic and cultural forces in the world." Amazon has more than 100 million Prime members which is 2.94% of all internet users. Amazon can be accessed in any search engine, by browsing in a browser, a direct link from other websites and etc. Like any other websites amazon is not an interactive website which means a user doesn’t take much time in the website as an entertainment websites. Amazon have 13% of conversion rate. In 2019, Amazon's revenue amounted to 232.9 billion US dollars.