The Standards Setters

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TABLE OF CONTENTS

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1 Standard Organizations

Indian Railways were introduced in circa 1853 and has developed leaps and bounds through the century. As we saw in the second chapter the Indian Railways is divided into multiple regions, this was done to ease management for the ever growing railways. Even though each region is managed individually it is paramount that all of them follow common standards. Therefore, a body known as Research Designs and Standards Organization (RDSO, see *http://www.rdso.indianrailways.gov.in)* was formed to set railway standards across all the regions.

In the earlier chapters we have studied definitions of various standards, how they have evolved and their importance. We have seen time and again that standardization may emerge from circumstances and sometimes control standards in the making. Some industries were quick to realize the advantages of standardization and started adopting them earlier than others. Standards were developed at a rapid pace and industry-specific standard setting organizations were formed. This led to the formation of industry-specific standard setting institutes.

Earlier we mentioned about RDSO, which is an industry-specific (railways) standard setting organization which is local, meaning within a country (sometimes it can also be a region, like Europe). Similarly, there are many International standard setting organizations that have developed innumerable standards. Many of these are adopted either from a particular industry or nation. Some of them may also have developed new standards on their own based on necessity of both the manufacturer and users. International standards can be adopted anywhere in the world, which can help in overcoming interoperability challenges. Nevertheless, commonly, international standards are localized for adoption. There are some worldwide common standards which are adopted AS-IS, like traffic lights, periodic tables, mathematical symbols…etc. We will read more on adoption in Chapter 4. Most of the standards are not mandatory until unless it's regulated by local Government or other regulatory bodies.

2 De Jure Standard setters

In earlier chapter we learnt about "De Jure Standards". These standards are developed by bodies which authorize the standards. These bodies can be local government, consortium, accreditation or other sources.

Broadly standard organizations are classified as follows;

Global standards Organizations – Standard setting organizations under this category are the developers of International standards. There are many worldwide standard organizations, to name a few well-known ones, *International Organization for Standardization (ISO), International Electrotechnical Commission (IEC)* and *International Telecommunication Union (ITU)*. These Organizations are market driven.

Regional Standards Organizations - these Organizations are formed mostly by a group of countries. *ASEAN Consultative Committee for Standards and Quality* consist most of the Asian countries, *European Committee for Standardization (CEN)* for Europe and so on.

National Standards Organizations – Each country has their own standard bodies like *Bureau of Indian Standards (BIS)*, *Standardization Administration of China (SAC)*...Etc.
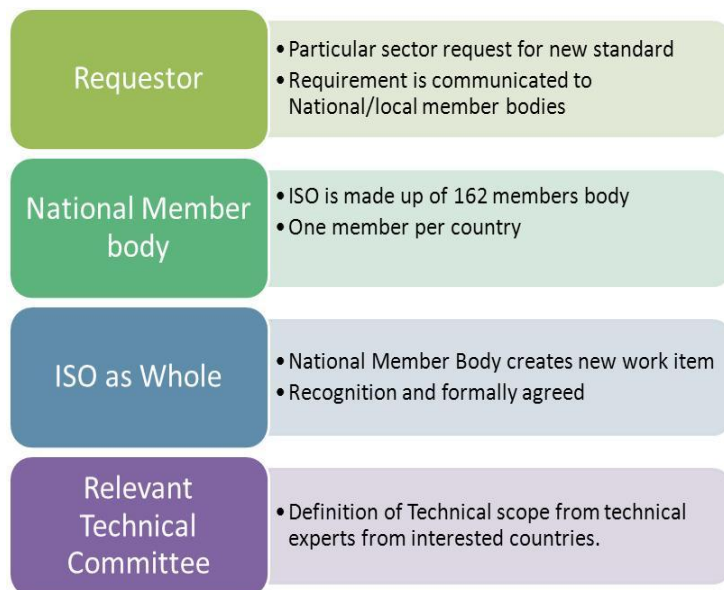
In the next section we will describe few of the standard setting bodies and their functions. Also, read how they help in shaping the world we are in.

2.1 International Organization for Standardization

International Organization for Standardization popularly known as ISO, is not an abbreviation, it's a short name derived from Greek "isos", meaning "equal". This was founded on February 23, 1947. It has its Headquarters based in Geneva, Switzerland. ISO is a non-governmental organization. ISO is a group of worldwide federations of national standards bodies from 162 countries at the time of this writing. Each country will have one ISO member.

Development of Standard

When any industry sector learns an impending need for a standard, it will communicate the need to the National member body. Every member country will have one ISO representative. Generally they can be a public or private sector non-profitable organization or both. National body will extend the need of a standard across all the members. Once the need for a new standard in the sector is recognized and agreed, particular technical committee will start its first step by defining the technical scope. In the second step, members will negotiate detailed specification for the standard. In the final phase the specification will have a formal approval. The approval is based on 75% of the voting member accepting the specification.

Requestor
- Particular sector request for new standard
- Requirement is communicated to National/local member bodies

National Member body
- ISO is made up of 162 members body
- One member per country

ISO as Whole
- National Member Body creates new work item
- Recognition and formally agreed

Relevant Technical Committee
- Definition of Technical scope from technical experts from interested countries.

Development stages

In the above topic *"development of standards"* we read the process flow on how the ISO standards are developed. Now, we will learn the 6 stages involved in the development.

Stage 1: Proposal Stage

During this initial stage the need for a new standard is assessed. The assessment is submitted to the technical committee for voting. Once the vote is in favor, a project leader is appointed who will further to next stage.

Stage 2: Preparatory stage

The Project leader will start the preparation of the working draft. The draft will undergo multiple iterations until the working group is satisfied.

Stage 3: Committee stage

Once the draft is available it's registered by the ISO Central Secretariat. It will be scrutinized and probably voted by Technical committee (TC) /Subcommittee (SC) for a majority. Once an agreement has been attained, the text is finalized for submission as a draft International Standard (DIS).

Stage 4: Enquiry stage

The Draft International Standard (DIS) is circulated to all ISO members for voting and comments within a period of 5 months. If two third of the majority are favoring the draft then a final draft international standard (FDIS) is prepared. If the draft fails to attain two third of the majority then, it's sent back to technical committee to further study.

Stage 5: Approval stage

The final draft international standard is circulated to all the ISO members for the final acceptance within 2 months. If any technical comments are received during this stage, they are no longer considered in this stage but will be registered for consideration for next revision. If the acceptance is less than two third the standard is referred back to technical committee.

Stage 6: Publication stage

Once a final draft International Standard has been approved, only minimal editorial changes will be considered and changed. The final text is sent to the ISO Central Secretariat which publishes the International Standard.
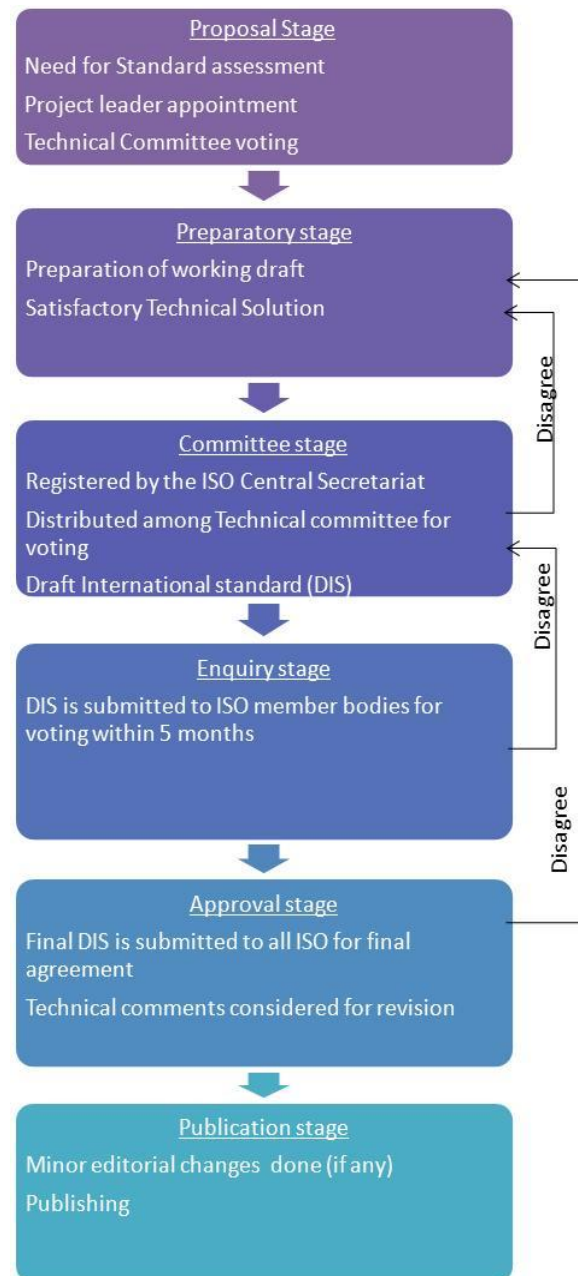
Review of International Standards

All the Published international standards are reviewed at least once in 3 years and every 5 years after the first review. During the review, the Technical Committee will decide whether an international standard should be confirmed, revised or withdrawn.

Proposal Stage
Need for Standard assessment
Project leader appointment
Technical Committee voting

Preparatory stage
Preparation of working draft
Satisfactory Technical Solution

Committee stage
Registered by the ISO Central Secretariat
Distributed among Technical committee for voting
Draft International standard (DIS)

Enquiry stage
DIS is submitted to ISO member bodies for voting within 5 months

Approval stage
Final DIS is submitted to all ISO for final agreement
Technical comments considered for revision

Publication stage
Minor editorial changes done (if any)
Publishing

Disagree
Disagree
Disagree

2.2 International Electrotechnical Commission

The International Electrotechnical Commission (IEC) is one of the three global sister organizations (IEC, ISO, ITU) that develop International Standards for the world. IEC was founded in 1906; they prepare and publish International Standards for all electrical, electronic and related technologies. At the time of this writing IEC has 60 full members, 21 associate members. Countries can become a member by forming an Electrotechnical committee in their own country, which will be called as National committee. For example, Bureau of Indian Standards (BIS) is a full member of IEC.

Standards Development Hierarchy

The Standardization Management Board (SMB) is on the top of the hierarchy and it is responsible for the overall management. There are three bodies under SMB; technical committee, technical advisory committee and strategic groups.

Technical committees are formed by SMB based on the requirement. The scope is prepared by SMB, any changes to the scope requires to be approved. Technical Advisory Committee helps to ensure compatibility. Strategic Groups helps monitor market needs and outlining any potential cross-over of work. When the quantum of work is substantial, technical committee can create subcommittees to complete the work efficiently. Technical committees are comprised of National
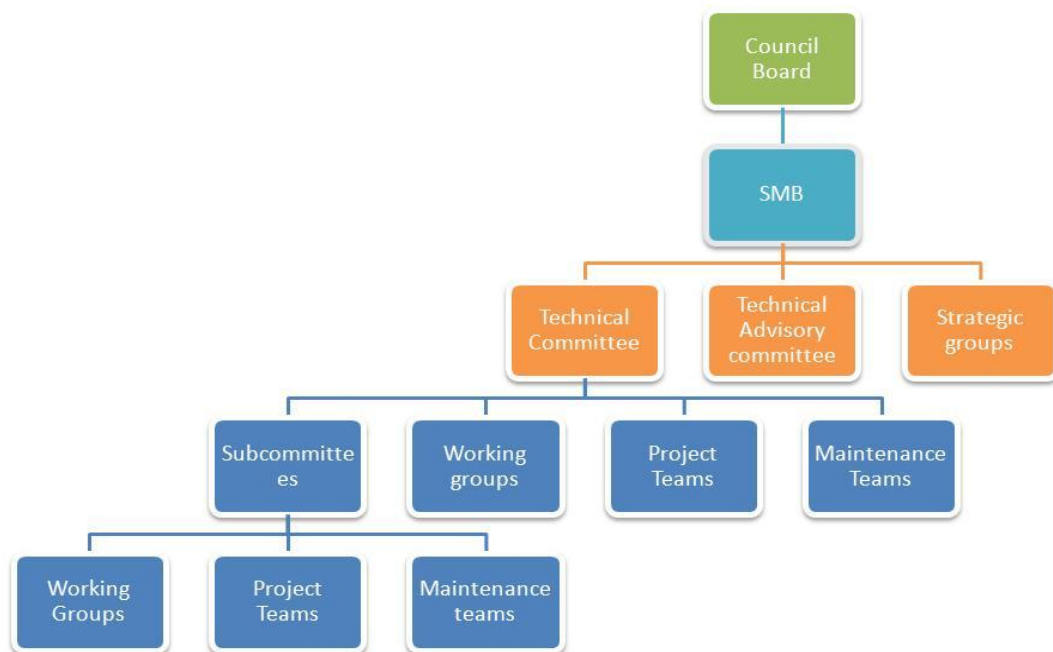
committees. They can be elect to beParticipating members (P-Member), who can vote and attends all meetings or observer members(O-member), who can observe the proceedings and have right to submit comments. The IEC development stages are almost the same as ISO development stages with an addition of Preliminary stage. See the following link for more details (http://www.iec.ch/standardsdev/how/processes/development/)

2.3   International Telecommunication Union

The first telegraph was sent during the summer of 1844, which started a new era in communication called Telecommunication. It changed the way we send messages; we were able to communicate with our families and friends much efficiently but within a country. During those days, telegraph lines did not cross country borders.   Because each country used different systems, messages had to be sent to frontiers, and then messages were re-transmitted over the system in the neighbor country. This tedious process eventually led to agreement between countries for interconnection. The exponential growth of telegraph across many countries prompted many countries to jointly develop a framework of international interconnection and standardize equipment used for sending messages. This is a classic example of how standards develop out of necessity and later becomes worldwide standard.

After many months of negotiation between countries the first International Telegraph Convention was signed and the International Telegraph Union (ITU) was established. Post Second World War, ITU and United nations (UN) signed an agreement and ITU became UN's specialized agency.

ITU has three main areas of activity as below;

- ITU-R – Radio communication sector works with mainly Radio communication services and also radio-frequency spectrum and satellite orbits.

- ITU-T – Telecommunication standardization sector primarily operate in Information and Communication Technologies (ICT)

- ITU-D – Telecommunication development sector helps people have access to information and communication technologies without social and economic barrier.

The domain of study for this semester is standards; therefore, I will broadly describe ITU-T standard approval process. The approval process is classified into alternative approval process (AAP) and traditional approval process (TAP). Standards will be approved using AAP until unless there are any policies or regulatory implications.

Alternative Approval Process:

Experts from both public and private sectors come together to prepare draft recommendation (or standard), they are called Study Group (SG). There are many study groups who specialize in a particular domain under ICT. After multiple iterations of review, the draft is submitted to working party meeting. Once the draft is sufficiently matured the director of ITU-T will approve to start the AAP procedure by posting the draft on the ITU-T website and requesting for comments from the members.

The next phase is known as last call. It is a four week period in which comments can be submitted. If there are no comments it will be considered approved. If there are any comments, the SG chairman, in consultation with Telecommunication Standardization Bureau (TSB), sets up a comment resolution process by the concerned experts. The revised text is then posted on the web for an Additional Review period of three weeks. If there are no comments it's deemed approved. If there are comments the draft text and all comments are sent to the next Study Group meeting for further discussion and possible approval. If the Study Group Chairman sees that there is insufficient time for comment resolution then they are considered in the next study group meeting for resolution.

2.4 ASEAN

So far, we have read how Global Standard setting Organizations came into existence and what constitutes these organizations. We also looked at their elaborate process to understand the need for a standard and development of standards, not just within a particular industry but across industries and their interoperability. Without doubt they have been a corner stone for many industry standards we see today. Global Standard Organizations as the name suggest are developed to be used anywhere on the planet. But, due to regional necessity or requirement, Regional Standard Organizations were formed to follow a common standard across the member of the Regional Standard Organization. This does not mean Regional Standard organization cannot adopt international standards. In fact ASEAN are in cooperation with ISO. We will learn more on standard adoptions in the next chapter.

Association of Southeast Asian Nations (ASEAN) was founded on 8th August 1967 with 5 country leaders, Indonesia, Malaysia, the Philippines, Singapore and Thailand. As of today ASEAN consists of 10 member states. The aim of ASEAN is to fasten social and economic growth among all the member countries. As the member countries integrate there was exponential progress in economy. This encouraged ASEAN to have a common effective Preferential Tariff (CEPT) scheme. This scheme enabled ASEAN member to reduce intra-regional tariffs. The scheme promoted ASEAN Free trade Area (AFTA) which is a mutual agreement between manufactures within the region. It gave them advantage as a production base geared for the world market.

During 2009 ASEAN comprehensive Investment agreement (ACIA) was signed. This agreement promotes free flow of investments. Attracting more foreign investment into ASEAN and increasing intra-ASEAN investment. This led to major influx of foreign direct investment (FDI). ACIA reduces investment impediments and increases investor's protection. There are many ASEAN standards and policies that have transformed the region from independent to interdependent. To learn more standards and policies governed by ASEAN, visit www.asean.org

When countries integrate within a region it can bring forth not only economic growth and stability but also rural development and peace within the members. Even though individually these countries are small in geography they can create big impact when acted singularly. This single-minded focus will help prosperity to soar newer heights. This only reaffirms that standards are paramount for growth of industries and economies.

2.5   Bureau of Indian Standards

Bureau of Indian Standards (BIS) is a national standards body engaged in developing, implementing and certifying standards in India. BIS came into existence through an Act of Indian Parliament on 1 April 1987. BIS is engaged in formulation of Indian Standards for the following sectors;

- Production & General Engineering
- Chemicals
- Civil Engineering
- Electronics and Information Technology
- Electrotechnical
- Food and Agriculture
- Mechanical Engineering
- Management and Systems
- Medical Equipment and Hospital Planning
- Metallurgical Engineering
- Petroleum Coal and Related Products
- Transport Engineering
- Textile
- Water Resources

BIS has introduced many standards across the sectors mentioned above. Hallmarking of Gold jewelries was started in 2000 on voluntary basis and later in 2008 Hallmarking was made mandatory, which measures the purity of Gold. BIS committee was involved to decide a document format across all the Governmental Organizations in India. ODF (open document format) was later decided as a standard. BIS also introduced stringent packaged and bottled drinking water for long term protection of public health. BIS runs other important systems certification schemes under the Management Systems Certification and Quality Management System Certification Scheme (QMSCS)

BIS have about 8 laboratories across India for testing the products. BIS also has approved third party laboratories apart from their own laboratories. Most of the standards developed are derived by the nations' need for a standard. BIS certification wing enables local product developers to voluntarily certify their products. However, some of the certifications are made mandatory by Government due to health and security reasons. All foreign manufacturers who intend to export to India are required to obtain a BIS product certification license.

One of the noteworthy mandatory standards enforced by BIS is "IS 15245: 2002". This standard is for the digital set top box for cable Television in India. Whoever intents to build set-top-box can download the specification from the following link for a nominal cost. http://www.standardsbis.in

Since its inception BIS has been an active member of international organizations namely, ISO and International Electromechnical Commission (IEC). BIS represents India as Member Body in ISO and IEC. It holds Participating Membership (P) status in 259 Technical Committees/ Sub-committees of ISO and 62 Technical Committees/ Sub-committee of IEC, whereas it is Observer Member (O) on 308 Technical committees/ Sub-committees of IDO and 84 Technical Committees/Subcommittees of IEC.

3   De Facto Standard Setters

As we have learnt in first chapter, De facto Standards are those that have been widely used in the industry. Unlike de jure standards, de facto standards do not have any governing bodies like ISO, IEC...etc. A de facto standard is formed when a set of people or companies sharing the same purpose come together. Generally these groups do not have any membership fee. Also, they do not have any obligation with the Government.

In certain cases, the product specifications of a dominant supplier in the market may become a *de facto* standard. Therefore, De facto standards can be either open or closed. Sometimes a standard becomes de facto because it's been intrinsic part of the already popular de facto standard like, Audio format Windows media player (WMA) is part of already popular Microsoft Windows operating system.

Below, we will look at couple of popular groups that has changed the way mobile phones and computers communicate and transfer data.

3.1   Bluetooth™ Special Interest Group

Any new mobile phones today are loaded with features like, camera, document editor, games…etc. Within few days after you buy your mobile, you will have tons of data loaded on it. How will you transfer this data to your home computer? Probably by connecting your mobile device to your computer via USB or wirelessly transfer via Infrared (IR). USB is not wireless therefore, one has to carry a USB cable all along and IR has to be in direct line of sight for communication. To complement IR, Bluetooth was developed by Ericsson engineers in 1994. Later a group of companies agreed to work together on Bluetooth technology. They formed a group known as," Bluetooth Special Interest Group" (SIG). The SIG oversees all the development activity on Bluetooth today.

A company which choses to adopt Bluetooth technology into their product should become a member of SIG. Depending on the level of membership, members will be involved in creating specifications. Companies adopting the Bluetooth wireless technology should adhere to specifications. There are three levels of membership with each level having various benefits.

Promoter: These are the core members who take part in strategy building with each representing one seat for board of Directors. The promoter members are mainly representatives from their respective industries.

Associate: Associate members have access to draft specifications. In addition, Associate members have the ability to review specifications prior to their public availability. An annual fee depends on company's Annual revenue.

Adopter: Adopter members are entitled to use published *Bluetooth* wireless specifications in their product Adopter members do not have the opportunity to influence or gain early access to unpublished Bluetooth specifications.

Bluetooth Special Interest group is a classic example of Open proprietary standard. To learn more on their process, stages of qualification, build and testing of product, visit www.bluetooth.org

3.2 USB Implementers Forum

Universal Serial Bus, popularly known as USB has been most widely used to connect devices to computer. The development of USB was started by a group of seven companies - Compaq, DEC, IBM, Intel, Microsoft, NEC and Nortel in mid 90's. The first USB 1.0 was released in 1996 and the rest is history. USB Implementers forum was established in 1995 to support and accelerate the market and consumer adoption of USB compliant peripherals. At the time of this writing there are about 600 members to this forum. One can become a member to exercise the benefits mentioned below;

- Eligibility to participate in free USB-IF sponsored quarterly Compliance Workshops
- Free Vendor ID (if one has not been previously assigned)
- Opportunities to participate in USB-IF marketing programs and events, such as retail newsletters, store endcaps, featured products, Etc.
- A company listing in the USB key contacts list
- Eligibility for inclusion in the USB current products list on the usb.org web site and in periodic USB-IF retail newsletters
- A waived logo administration fee when joining the USB-IF logo program
- Discounts on Developer Conferences, products in the e-store, etc
- Eligibility to participate in Device Working Groups
- Free CDs of the specifications and the ability to request 2 hardcopy spec books to new members of the USB-IF

The USB specifications can be downloaded absolutely free by visiting the site http://www.usb.org/developers/docs/.

4 Testing and certification

So far we have learnt how different standard organizations came into existence. To develop and maintain standards there is operational cost for the office space, hire experts, equipment's…etc. A portion of the operational cost is met by membership fee, sales of standards, test and certifications. As this may not be sufficient; most of the costs are borne by organizations which are involved in that specific project.

Specifications are created for standards and they are made accessible to implementer. Organizations that test the standards normally known as the certifying body validate the conformance of the standard developed by the vendors or product manufacturers against the standard specifications. The product developers can chose to test the product in the test laboratories of the certifying standard organizations. After the product is tested and certified from the standard setting organizations the product developers are allowed to display certain logo to indicate to their customers that they are certified by the testing organization.

5 Summary

Standard organizations are formed out of sheer necessity in industry and also for interoperability. We have learnt that these organizations have a particular hierarchy which can streamline adoption into a specific industry, region or a country. This will also help in compliance with any local governmental regulations. Some standard organization offer specifications at a nominal cost, no cost and some are proprietary open standards. The products are not only built with a standard specification but also can be certified to ensure the safety of the customers. Whichever, standard one choses to adopt will surely reap the benefits and share the same with the consumers.

6 References

1.   www.rdso.indianrailways.gov.in - Research Designs and Standards Organization

2.   www.iso.org – International Organization for Standardization

3.   www.iec.ch - International Electrotechnical Commission

4.   www.itu.int - International Telecommunication Union

5.   www.bis.org.in - Bureau of Indian Standards

6.   www.bluetooth.org

7.   www.usb.org - Universal Serial Bus

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