



Economic benefits of standards – Pilot projects – Final report: Vietnam

1. Objectives and organization of the pilot project

This pilot study is based on the selection of one company in Vietnam in order to assess the economic benefits which this company obtained from using standards. Before introducing the company, a short overview of standardization activities are given in Vietnam to demonstrate the relevance of this study.

1.1 Standardization activities in Vietnam

Standardization activities have been implemented in Vietnam for nearly 50 years. These activities contributed to production, trade and business development and also have solved issues related to socioeconomic requirements in different periods of development of country.

In recent years and as a consequence of the globalization in trade, the important role of standards is becoming ever more evident. Everybody in the economy can recognize the integral role of standards as well as the benefits brought by standards. Standards are considered as technical tools to improve product quality, enhance competitiveness, facilitate domestic, regional, and international trade, speed up innovation and disseminate and transfer technology. In addition, standards also help to address global issues such as social responsibility, societal security, environment, climate change and others. However, in Vietnam there has been no systematic study about the impacts and benefits of standards. Benefits of standards are mentioned in some scientific documents but there's no quantitative assessment about the impacts and benefits of standards.

Therefore, when ISO released the ISO methodology to assess the economic benefits of consensus-based standards and invited the Member Bodies to participate in pilot projects to apply this methodology, Vietnam was delighted and expressed its interest to participate. In East and South East Asia, Vietnam was one of the ISO members (together with Singapore, Thailand and Indonesia) to conduct such studies.

It was recognized that participation in this pilot project will help the NSB to address systematically the issue of economic benefits of standards to:

- enable stakeholders in both the private and the public sector to better appreciate the economic and social impacts of voluntary consensus standards, and
- raise the awareness of policy makers and business leaders as to the importance of standardization.

This pilot project of applying the ISO methodology is seen to be an excellent opportunity to describe and quantify the benefits of standards – which is extremely important for monitoring and prioritizing standardization activities, as well as for raising awareness and improving communication, promoting the use of standards and encouraging stakeholder participation.

This project was conducted for a company in the electrical appliances industry. Initially, the main objectives were:

- Apply the ISO methodology to assess the standards impacts for the electrical appliances industry

- Evaluate the results to obtain the EBIT impact of standards on one company in the industry sector
- From the achieved result at the company level expands to a broader level – the industry level and then the entire economy that will be covered in another project.

However, given the complexity of the industry and the available time and resources, it was not possible to expand the project. The scope of the study is therefore restricted to the electrical appliances sub-sector of the national industry. The case study is a company that operates in this sector with the assessment of the impacts of standards for one business unit. The products also limited to 2 kinds of product, one is the traditional product and the other a new product for the company with a high potential of development.

Under the authorization of STAMEQ - the National Standards Body of Vietnam - the Vietnam Standards and Quality Institute (VSQI) conducted the project, which began in September 2010 and ended in March 2011.

The project team included:

- 1) Mr. Pho Duc Son, Director of VSQI , Project leader
- 2) Mrs. Man Thuy Giang, project consultant
- 3) Mrs. Bui Ngoc Bich, project assistant

In addition, the project was supported by an ISO expert through joint face-to-face activities, web-conferences, email exchanges and experts of the selected company.

1.2 Economic policy context

With a view towards building a common market of the Association of Southeast Asian Nations (ASEAN), it is the objective to provide common technical specifications for products and services, which are based on regionally harmonized standards as well as international standards.

Electric and electronic products are some of the first products in this harmonization process. As the result, in Vietnam standardization activities for electric and electronic products are currently one of focus activities. With the growth of the economy, industrialization and modernization in Vietnam, the electric engineering industry is also growing very quick and has a very high potential of development.

There is a roadmap for the electrical equipment manufacturing industry and, according to experts^[1], the development opportunities are huge due to the consumption potential in the country and abroad.

For the **domestic market**, according to the governmental development plans for the period 2015-2025 for the electrical equipment manufacturing industry, it is the objective that the domestic electrical equipment industry will meet the domestic demand by 70% of the line equipment, transformer stations and by 55% for electric motors. It is planned that some types of commonly used generators are built domestically in 2025 and that the domestic industry can manufacture and supply a complete range of electrical works for power lines, transformer stations, 50-60% of the demand for 110-220 KV transformer. Furthermore, in 2015 exports should reach 30-35% of production to meet demand for 60-70% of the domestic demand for all kinds of electrical meters, electrical instruments, recorded counting systems - monitoring the safety of the power grid, a complete range of power station equipment, and exports reach 19-20% of production concentrated

in manufacturing high quality electric wire and cable with a turnover from exports increased by 35.5% per year.

For **export markets**, besides the traditional markets, the electrical equipment manufacturing industry, has also a huge potential market in neighboring Laos and Cambodia. With these two markets, Vietnam has made commitments in the form of memoranda of understanding and cooperation and investment agreements.

2. Introduction of the selected company

An electric devices manufacturer has been selected for the study.

Electrical Devices Joint Stock Company No. 1 (VINAKIP) ^[2] is under Vietnam Electrical Equipment Corporation which belongs to the Ministry of Industry and Trade, and was established in 1967. This is a Joint stock company with state ownership of 36,03 % and 63,97 % is owned by private stakeholders.

VINAKIP is located in the Xuan Khanh Dist., Son Tay Town, Ha Noi City, which is 70 km away from the center of Ha Noi City. It has a staff of around 540, 7 branch offices over the country (located in Ha Noi, Quang Ninh, Nghe An, Quang Binh, Da Nang, Ho Chi Minh, Buon Ma Thuot) and 19 distributors.

Main types of products produced by VINAKIP are sockets, wires and cables, electromagnetic ballasts, plugs, switches, lamp holders, electrical boards, circuit breakers, magnetic contactors, and fuses.

Currently, the market for products of the electrical industry is expanding quickly in Vietnam. The market growth per year is around 16%, so there is a high demand and good perspectives for the sales of the products. At present, VINAKIP produces only for the domestic market. It intends to export in the future. An "indirect" form of export of some VINAKIP products has occurred by their use in construction projects that have taken place in other countries in the South East Asian region. Apart from household appliances, the company provides a significant amount of products for the construction and electricity industries. Due to the very high rate of development of the industry, VINAKIP has a high growth potential.

The company's total revenue in recent years is shown in the table below:

Year	Revenues in current VND (in billion VND - Vietnam Dong)	Inflation rate (*)	Inflation-adjusted revenues (in billion VND) [adjusted to 2005 prices]
2005	83	9.5%	83
2006	88,3	8.3%	81,53
2007	111,1	7.5%	95,45
2008	123,1	8.3%	97,62
2009	172,7	24.4%	110,07
2010 (**)	196	7%	114,09

(*) The inflation-adjusted revenues have been calculated using 2005 as the base year. The inflation rates are based on the CIA World Fact book with information obtained from the following source: http://www.indexmundi.com/vietnam/inflation_rate_%28consumer_prices%29.html. To

ensure comparability, the revenues have been adjusted to 2005 prices. Details about the calculation can be found in Annex 3 of this report.

(**) Estimated values

In the domestic market, there are several other large manufacturers which also produce the same type of products as VINAKIP. These include: Power Engineering JSC (PEC) under the Electricity of Vietnam, Hanoi Transformer Manufacturing and Electric Material JSC, Electric Equipment Corporation (THIBIDI), Vietnam Electric Wire and Cable JSC (CADIVI), Vina LS Cable Co., DongAnh Electrical Equipment Manufacturing JSC, HANAKA Group JSC.

Recognizing the severity of competition with those competitors, VINAKIP decided to focus on customers with average and low income. Compared with other firms producing the same type of electrical equipment, VINAKIP's products are superior in terms of quality and are manufactured and tightly controlled through the quality management system ISO 9001:2000. Products are controlled and it is assured that they have a stable quality and meet the expectations of the customers. To achieve this objective, VINAKIP pays consistently attention to investments in equipment, technology, focusing on research, development, improvement advanced products, to thoroughly motto: "always listen [to the customers] and constantly improve". On that basis, VINAKIP studies market requirements, researches products and services of its competitors, develops product improvement plans for its traditional products and designs and manufactures new products to increase its competitiveness in the market.

Standards are used throughout all the strategic decisions as well as the production process of the company.

3. Attitude of the company towards standardization

In the past VINAKIP was a state-owned company and was forced to use standards, which, at that time, had the status of technical regulations. After the Law on Standards and Technical regulations took effect in January 2007, the use of standards has become voluntary and standards are only mandatory if they are quoted in technical regulation. The company continues to use standards as a foundation for the work. Therefore, using standards is a tradition and has a history in VINAKIP. The company management and its staffs are well aware of the important role of standardization in their business. VINAKIP uses standards from the beginning of the production that means starting from the phase of product design. It also uses standards to manage its business internally as well as with its suppliers and customers.

At present, the company applies mainly national standards (TCVNs) and IEC standards (for further details see section 6). It has been certified against ISO 9001:2000 since 2003.

According to the top management of the company, the main reasons for using standards are:

- Higher reliability of the technology covered by the standards;
- Higher degree of interchangeability and compatibility of products;
- Support in the organization of processes;
- Requests from customers for the application of standards;
- Legal requirements stipulate that product documentation, including labels, have to contain information about applied standards;
- Regulatory requirements for the use of standards in case of health and safety aspects.

The company has accordingly registered to the standard information networks SICNET and TCVN-NET in order to receive updated information about national, foreign, regional and international standards. In addition to this, they also develop their own internal standards mostly on the basis of existing external standards.

VINAKIP is not an official member (participating member) of any national technical committee (TC) in Vietnam, but it regularly gives comments on drafts of TCVNs and sends representatives to participate in meetings during the development of national standards in the relevant fields.

4. Analysis of the value chain

4.1 Industry value chain

The electrical equipment industry is divided into three sub-sectors:

- stable electrical equipment;
- rotation electrical machines;
- electrical devices

The selected company (VINAKIP) belongs to electrical devices sub-sectors. This sub-sector uses the following main materials in its production:

- Metal including cooper, aluminum, alloy, steel;
- Plastics;
- Insulated Porcelain.

In addition it uses the following services for its business activities:

- Transportation;
- Testing;
- Installation;
- Subcontractors for the manufacture of spare parts or for special technologies such as plating or painting.

Customers of products of this sector include electricity and construction industries and consumers (end users).

The industry value chain is shown in the figure below:

		- In house Logistic
F	Production/Operations	<ul style="list-style-type: none"> - Production Planning - Material checking - Producing - Fitting - Testing - Non conformity products Control - Traceability - Non conformity Correction and Prevention - Production Innovation
G	Outbound Logistics	<ul style="list-style-type: none"> - Packaging and Labeling - Warehousing - Distribution - Delivery - Transportation
H	Marketing & Sales	<ul style="list-style-type: none"> - Market survey - Orders receiving and considering - Customer satisfaction measurement
I	Services	<ul style="list-style-type: none"> - After-sales services - Feedback from customers

4.3 Key value drivers

Value drivers are capabilities of companies that give them an advantage over their competitors and that are central to their business success.

Following interviews with the company manager, the table below gives an overview of the value drivers of the company.

Key Value Drivers	Description
Safety and Quality of Products	Due to specific characteristic of electrical products, safety is the very most important that all producers have to pay attention. Safety of products will decide reputation and position of the company in the market.
Continuous Improvement	Improvements will bring two competitive advantages to the company: <ul style="list-style-type: none"> - Firstly, products improvement will highest satisfy demands of customers that changing regularly; - Secondly, with very critical competition in market, improvement will make the company optimize its activities mostly production activities. So that, the company can enhance affectivity of production process and bring about reducing of cost price and have advantage in competition with other competitors.
Price	Products with reasonable price but high quality is a very competitive advantage which suitable for almost population with medium income
Customer orientation	The decisive factor in R&D prior to design and production of new types of products.

5. Scope of the assessment in the pilot project

Due to limitations in the study time and in order to focus on important company activities, the project team and the VINAKIP management agreed that the core of the study should be on assessment of the economic benefits of standards in the following business functions:

- Inbound Logistic
- Production.

However, the following business functions have also been partially addressed:

- Procurement,
- Research and Development,
- Marketing and Sales.

Although it had been the objective to also include Outbound Logistics in the assessment, it was not possible to find quantifiable data for this business function. This is the reason why we finally decided to give up pursuing a deeper analysis of this function.

6. Use of standards by the company: Standards used in the company value chain

Standards applied for companies activities are mainly national standards and these standards are almost identical with international standards (ISO and IEC). The main standards applied in the company value chain for the business functions under assessment related to the two investigated products, sockets and wires & cables, are listed in table below:

Business Functions	Standards applied		
	Products	Processes	Compliance
Inbound Logistics	TCVN 5933:1995 TCVN 6144-1-1:2000 TCVN 6610-1:2007	TCVN ISO 9001:2008	
Research and Development	TCVN 2244:1999 TCVN 2245:1999 TCVN 4683-1:2008 TCVN 4683-2:2008 TCVN 4683-3:2008 TCVN 2246-1:2008 TCVN 2246-2:2008 TCVN 1917:1993 TCVN 2250:1993 TCVN 2253:1977 TCVN 7582-1:2006 TCVN 7582-2:2006 TCVN 7582-3:2006 TCVN 7582-4:2006 TCVN 7583-1:2006		
Production	TCVN 6099-2:1993 TCVN 6190:1999 TCVN 6483:1999 TCVN 6610-1:2007 TCVN 6610-3:2000 TCVN 6612:2000	TCVN ISO 9001:2008	TCVN 6188-1:2007

	TCVN 6610-4:2000 TCVN 6610-5:2007 TCVN 6614-1-1:2000 TCVN 6614-1-2:2000 TCVN 6614-1-4:2000 TCVN 6614-3-1:2000 TCVN 6614-3-2:2000		
Outbound Logistics		TCVN ISO 9001:2008	TCVN 6188-1:2007

NOTE: See Annex 1 for additional information on the standards listed in the table above.

7. Selection of operational indicators to measure the impacts of standards

In the following table a list is given of the operational indicators that are used to quantify the impacts of the standards. The majority of the indicators are related to the business functions inbound logistics and production. However, some indicators are also related to the whole value chain in VINAKIP (indicator 6). Another indicator (indicator 8) represents a one-time impact in the Research & Development function.

No	Related business function / Type of data measured	Indicators	Definitions
1	Procurement Type: Average savings per year	Reduction in costs for supplier management	By applying standards for materials, the company can cooperate with more reliable suppliers and can reduce the cost for supplier management in terms of time and human resources.
2	Inbound logistics Type: Average savings per year	Reduction in costs for materials testing	By applying standards for materials, the company can save costs for materials testing before production through a reduction of the testing frequency
3	Production Type: Average savings per year	Reduction of waste (products that have to be disposed of and cannot be re-used or repaired)	By applying standards for materials, the rate of waste can be reduced
4	Production Type: Average savings per year	Replacement costs for non-functional products (warranty)	By applying standards for products, the rate of products that needs replacement can be reduced
5	Production Type: Average savings per year	Reduction in costs for testing final products	By applying standards, the company can save testing costs of final products through a reduction of the testing frequency
6	Production Type: Average savings per year	Saving of costs in production by continuous improvements	By implementing a QMS according to ISO 9001 and applying continuous improvement processes to promote initiatives, the company can save a significant amount of costs in production in terms of time, human resources, materials and can achieve product improvements
7	Production	Savings of materials in	By using materials conforming to

	Type: Average savings per year	production	standards the company has less wasted materials in production
8	Research & Development Type: This is a one time saving (not an average saving per year)	Savings due to not having to write specifications internally	Using existing standards for materials, products, processes etc., the company has savings (money, time, human resources) otherwise needed to write internal specifications
9	Sales & Marketing Type: Average sales revenue increase per year	Increases in revenues due to improved confidence of customers by using standards	Demonstrating that products of the company conform to external standards (national or international) increases customer confidence, which leads to an increase in sales

8. Calculation of the economic benefits of standards

In section 8.1 a calculation is provided of the impacts of standards as annual impacts in Vietnam Dong (VND) on the basis of prices of 2010. Section 8.2 provides an inflation-adjusted calculation for a five-year period between 2006 and 2010 in which we expected to see the impacts of standards.

The details of the calculations are contained in Annexes 2 and 3 of this report.

8.1 Annual impacts of standards

The table below gives the impacts from standards on the basis of the 9 operational indicators defined in section 7.

Business functions	Operational Indicators	Financial impacts
Inbound Logistic (IL)	Reduction of suppliers management cost	
	Reduction cost of materials testing	10.225.000
Total 1 (IL)		10.225.000
Production (Prod)	Reduction of waste	62.374.507
	Reduction cost for replacement of non-functional products	5.082.912
	Reduction cost of testing final products	700.000.000
	Saving cost relying on continuous improvement	2.500.000.000
	Saving materials in production	159.651.000
Total 2 (Prod)		3.427.108.419
Marketing & Sales (M & S)		3.797.145.600
Total 3 (M & S)		3.797.145.600

Business functions	Operational Indicators	Financial impacts
Research & Development (R & D)	Savings due to not having to write internal specifications	1.280.000.000
	Savings per year (of a total of 5 years)	256.000.000

Business functions	Annual impacts (in 2010 prices)
Selected business functions (BF)	Impacts of standards (annual average impacts)
Inbound Logistic	10.225.000
Production	3.427.108.419
Marketing & Sales	3.797.145.600
R & D (per year)	256.000.000
Total impact	7.490.479.019

In 2010, revenue from the sales of sockets is approximately 35 billion VND, of wires and cables around 37 billion VND, so the total revenue from the sales of these two products is 72 billion VND.

Production cost of sockets is about 15,3 billion VND and of wires and cables is about 21,5 billion VND, so the total costs of producing these products amounts to 36,8 billion VND.

Earning from these products before payment of interest and tax is: 35,2 billion VND.

The percentage of the total financial impacts due to the use of standards on the **company EBIT** calculated for the two products is **21,3 %** and is calculated as

$$(7.490.479.019 \text{ VND} / 35.200.000.000 \text{ VND}) \times 100 = \mathbf{21,3 \%}$$

The percentage of the total financial impacts due to the use of standards on the company revenue which is generated by **sales of the two products** is **10,4%** and is calculated as

$$(7.490.479.019 \text{ VND} / 72.000.000.000 \text{ VND}) \times 100 = \mathbf{10,4 \%}$$

This is the percentage contributed by the use of standards to the revenues from the sales of the two selected products (Sockets and Wires & Cables) within the following main activities that are: Inbound Logistic, Production, Marketing & sales and R & D.

If we calculate these impacts as a **percentage of the total sales revenue** of the company in 2010, then the percentage is $(7.49 \text{ bill VND} / 196 \text{ bill VND}) \times 100 = \mathbf{3,8 \%}$.

8.2 Inflation-adjusted calculation of standards impacts for a 5-year period (2006 and 2010)

Details of this calculation are contained in Annex 3, therefore only the results of the calculation are given here. Due to a significant inflation rate during this period, the impacts had been adjusted using as the basis the prices of the year 2005 to which all impacts had been adjusted.

The total impacts, adjusted for inflation, are as follows:

Year	Impacts (inflation-adjusted in VND)	USD/VND exchange rates *)	Impacts (inflation-adjusted in USD)
2006	3.906.581.735	15.322	254.966
2007	4.204.654.047	15.858	265.144
2008	7.486.610.874	16.376	457.170
2009	7.489.534.823	17.500	427.973

2010	7.490.412.917	18.802	398.384
Total	30.577.794.397		1.803.637

*) Exchange rates are taken on June 30th for this period, based on the following source:
<http://www.oanda.com/currency/historical-rates/>.

9. Qualitative and semi-quantitative considerations

Within the scope of this study, there are several impacts of standards that cannot be quantified. In particular, some of the benefits deriving from the use of standards cannot be directly quantified as indicated under item 8, mainly because of lack of data. Below are some examples for such cases:

a) Production

- With standardized specifications for specific components, the number of standardized products increases. Due to the reduced number of types of non-standardized products, production becomes more efficient. However, it was not possible to quantify this impact precisely.
- After introducing a quality management system based on the standard ISO 9001, internal information could be transferred faster, more efficient and more precise. Using standardized documentation and specifications means that internal information about products and services is passed on more efficiently within Production. However, no data is available to measure this impact.
- Production staff can be trained better because relevant specifications are standardized, both for products as well as for services and processes. However, it was impossible to arrive at an estimation of the effect on training of the use of standards.

b) Logistics

There are many impacts of management standards on logistics activities although, but there is no figure or estimation of these. Main impacts can be listed as follows:

- Standardized documentation, packaging, labels or tags of supplies makes receiving more efficient. Time savings as well as labor cost savings which can be observed but for which no data are available.
- Inbound Logistics can be conducted more efficiently due to the reduced number of types of supplies. In addition, due to the high availability of standardized products, fewer supplies need to be stored in the warehouse. Supplies are put into production faster, the time needed to process inventory items before putting them into production and their volume decreased.
- Training of staff in the Logistics function is mainly organized as self-training and on-the-job-training. The standardization of specifications related to products and services made training of the staff more effectively.
- An additional positive impact is improved customer satisfaction and customer confidence in the products although it cannot be quantified.

10. Evaluation of the results

The evaluation of the results of this study should take the following limitations into consideration:

- Standards are seen as having an enabling function by contributing to the overall value creation in addition to other factors so that there is no single cause which makes it difficult to describe the impacts of standards separately
- Company assessments are based on perceived effects and estimates because there is not sufficient technical or managerial data available
- The aggregated impacts of standards only cover the most relevant functions

The basic limitation of the approach is that most assessments of impacts have been based on the best estimates by the field study participants. Only for some cases actual data could be obtained and applied. Estimates of individuals are naturally influenced to a large extent by subjective perceptions.

Moreover, not all of the impacts could be quantified in all cases. Therefore, assumptions were based on qualitative estimations.

In order to validate and refine the findings of this study, the sample should be extended and the data (most of which were captured through interviews) should be further refined through an iterative process.

However, the results of this case study using VINAKIP as an example clearly indicate that the impact of standards on economic value creation for the company and, assumingly, for the industry is substantial. With a percentage of more than 20% of the company EBIT or 10% of the sales revenue for the two selected types of products, it is evident that standards have an important and integral role in contributing to the growth and success of the company. Despite the limitations of the study, the outcome can be considered to provide sufficient evidence that the use of standards is beneficial.

In order to further improve the impacts of standard VINAKIP needs to take part in standards development more actively and to transcend its history of merely using standards on the basis of a clear awareness of the importance of the role standards play in their business. In comparison with the contribution of standards and the economic benefits they bring to the company, it seems that the investment by VINAKIP in standards development is not yet sufficient.

11. Conclusions

The assessment of the impacts has shown that standards play a very important role in the success of the company. However it was not always possible to measure these impacts in a quantitative manner.

All members of the company agreed in the interviews that they could not continue their business successfully without standards. However, due to the lack of quantitative data it was not possible to quantify the impacts for many activities that showed the impacts of standards. The data included in the calculations are mainly based on estimates resulting from the experience of the interviewees.

In addition, other difficulties that were encountered had been that in some cases data on total revenues or data related to activities such as manufacturing, purchasing of raw materials, technical innovations, etc. were available but no separate data for each individual category of products of the company. The calculation of specific EBIT values for the two selected products was therefore affected by this limitation in the available data. Despite the limitations and difficulties, the overall objective of the project has basically been achieved satisfactorily.

The project has brought to the company itself and the project team valuable experience which can be used to expand the approach further. Above all, the project provides good evidence for the possibility to quantify impacts which seemed to be very difficult and in some cases not possible. It helps STAMEQ, the national standards body of Vietnam, and policy makers to gain evidence of the effectiveness of government investments in standardization activities in Vietnam. It is hoped that such evidence will contribute to a further improvement of standardization activities in order to even better support businesses, industries and the entire economy to achieve a stable and sustainable growth.

ANNEX 1: List of standards implemented by VinaKip relevant for the two products sockets and cables/wires

No.	TCVN number	Title	Identical with International standards
Product 1: Sockets 3N			
1	TCVN ISO 9001:2008	Quality management system – Requirements	ISO 9001:2008
2	TCVN 1917:1993	Metric threads. Fit with gap. Tolerances	
3	TCVN 2244:1999	ISO system of limits and fits. Bases of tolerances, deviations and fits	ISO 286-1:1988
4	TCVN 2245:1999	ISO system of limits and fits. Tables of standard tolerance grades and limit deviations for holes and shafts	
5	TCVN 2246-1:2008	ISO general purpose screw threads. Basic profile. Part 1: Metric screw threads	ISO 68-1:1998
6	TCVN 2246-2:2008	ISO general purpose screw threads. Basic profile. Part 2: Inch screw threads	ISO 68-2:1998
7	TCVN 2250:1993	Metric screw threads. Interference fits	
8	TCVN 2253:1977	Metric taper threads. Basic dimension and tolerances	
9	TCVN 4683-1:2008	ISO general purpose metric screw threads. Tolerances. Part 1: Principles and basic data	ISO 965-1:1998
10	TCVN 4683-2:2008	ISO general purpose metric screw threads. Tolerances. Part 2: Limits of sizes for general purpose external and internal screw threads. Medium quality	ISO 965-2:1998
11	TCVN 4683-3:2008	ISO general purpose metric screw threads. Tolerances. Part 3: Deviations for constructional screw threads	ISO 965-3:1998
12	TCVN 7582-1:2006	Technical drawings. Projection methods. Part 1: Synopsis	ISO 5456-1:1996
13	TCVN 7582-2:2006	Technical drawings. Projection methods. Part 2: Orthographic representations	ISO 5456-2:1996
14	TCVN 7582-3:2006	Technical drawings. Projection methods. Part 3: Axonometric representations	ISO 5456-3:1996
15	TCVN 7582-4:2006	Technical drawings. Projection methods. Part 4: Central Projection	ISO 5456-4:1996
16	TCVN 7583-1:2006	Technical drawings. Indication of dimensions and tolerances. Part 1: General principles	ISO 129-1:2004
17	TCVN 6099-2:1996	High-voltage test techniques. Part 2: Test procedures	IEC 60-2:1973
18	TCVN 6188-1:2007	Plugs and socket-outlets for household and similar purposes. Part 1: General requirements	IEC 60884-1:2002
19	TCVN 6190:1999	Plugs and socket-outlets for household and similar purposes. Types and main dimensions	

Product 2: Cables and wires			
1	TCVN ISO 9001:2008	Quality management system – Requirements	ISO 9001:2008
2	TCVN 5933:1995	Electro-technical round copper wire. General requirements	
3	TCVN 6610-1:2007	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V. Part 1: General requirements	IEC 60227-1:1998
4	TCVN 6610-2:2007	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V. Part 2: Test methods	IEC 60227-2:2003
5	TCVN 6610-3:2000	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V. Part 3. Non-sheathed cables for fixed wiring	IEC 227-3:1997
6	TCVN 6610-4:2000	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V. Part 4. Sheathed cables for fixed wiring	IEC 227-4:1992, Amd. 1:1997
7	TCVN 6610-5:2007	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V. Part 5: Non-sheathed cables for fixed wiring	IEC 60227-5:2003
8	TCVN 6612:2007	Conductor of insulated cables	IEC 60228:2004
9	TCVN 6613-1:2000	Tests on electric cables under fire conditions. Part 1: Test on a single vertical insulated wire or cable	IEC 332-1:1993
10	TCVN 6483:1999	Round wire concentric lay overhead electrical stranded conductors	IEC 1089:1991
11	TCVN 6614-1-1: 2000	Common test methods for insulating and sheathing materials of electric cables. Part 1: Methods for general application. Section 1: Measurement of thickness and overall dimensions. Tests for determining the mechanical properties	IEC 811-1-1:1993
12	TCVN 6614-1-2:2000	Common test methods for insulating and sheathing materials of electric cables. Part 1: Methods for general application. Section 2: Thermal ageing methods	IEC 811-1-2:1985
13	TCVN 6614-1-4: 2000	Common test methods for insulating and sheathing materials of electric cables. Part 1: Methods for general application. Section 4: Tests at low temperature	IEC 811-1-4:1985, Amd. 1:1993
14	TCVN 6614-3-1: 2000	Common test methods for insulating and sheathing materials of electric cables. Part 3: Methods specific to PVC compounds. Section 1: Pressure test at high temperature. Tests for resistance to cracking	IEC 811-3-1:1985, Amd. 1:1994
15	TCVN 6614-3-2: 2000	Common test methods for insulating and sheathing materials of electric cables. Part 3: Methods specific to PVC compounds. Section 2: Loss of mass test. Thermal stability test	IEC 811-3-2:1985, Amd.1:1993

ANNEX 2 Calculation of the economic benefits of standards in VinaKip

In this Annex the impacts of standards are calculated applying 9 different operational indicators for the four following business functions:

- Inbound logistics (2 operational indicators)
- Production (5 operational indicators)
- Research and Development (R & D) (1 operational indicator)
- Sales and Marketing (M & S) (1 operational indicator)

The financial impacts on the company EBIT are given in prices of 2010.

A. BUSINESS FUNCTION: INBOUND LOGISTIC

Indicator 1: *Reduction of supplier management cost* due to reduction of number of suppliers by ensuring that the supplies conform to quality requirements in relevant standards.

Because of using suppliers whose materials comply with requirements of standards, the number of suppliers of the company decreased to only 3 for metal and 3 for plastics supply instead of about 15 suppliers in total (as in the year 2000). The company can control better the supply process and can reduce costs for supplier management, for example, efforts for supplier assessment, control of records of suppliers, monitoring of the supply process, etc... These activities took time and effort of some staff and made their work more complicated and harder. However, it was not possible to quantify these benefits.

Indicator 2: *Reduction of costs for materials testing*

The company realized the savings of costs for materials testing standards were used for materials. Its savings can be calculated as shown below:

Product 1: Sockets

- a) Plastic for production
- In case of using standards, there are no costs for materials testing
 - In case of not using standards, costs for materials testing could be calculated as follow:

For each lot of 20 tons of plastic, the company will take a sample of 20 kg for testing, it will take a quarter of shift of workers, which is calculated as:

+ 1.000.000 VND for plastic

+ 40.000 VND for manpower

+ 2 hours x 30 kW x 1.000 = 60.000 VND

In total, cost for testing of 20 tons of plastic is:

$1.000.000 + 40.000 + 60.000 = \mathbf{1.100.000 \text{ VND}}$

Every year, the company purchases about 135 tons of plastic for the sockets, so the total cost of testing in case of not using standards is:

$1.100.000 \times (135/20) = \mathbf{7.425.000 \text{ VND}}$

- b) Rolled copper

- In case of using standards, no cost for materials testing occur
- In case of not using standards, the company has to take a sample to test for each time of purchasing of rolled copper. It is estimated that the cost for testing is about 400.000 VND for each sample. Each year the company has purchases bulk of rolled copper about 7 times so the cost for testing is:

$$7 \times 400.000 = 2.800.000 \text{ VND}$$

Total cost saving for testing materials for sockets is:

$$7.425.000 + 2.800.000 = 10.225.000 \text{ VND}$$

Product 2: Wires/Cables

There is no calculation for wires/cables because the company uses standards for materials for this product from the beginning of the production (since 2008) and does not carry out tests of materials for wires/cables.

Financial impact for indicator 2: 19.300.000 VND

B. BUSINESS FUNCTION: PRODUCTION

Indicator 3: *Reduction of waste*

Product 1: Sockets

In case of using standards, the rate of waste is 0,6 % due to product failures which result in rejection of the products by customers. In case the company does not use standards, the rate of waste, which results in rejection, is about 0,9 %. This means that the rate was reduced by 0,3 %.

Output of sockets produced every year is about: 2.120.500

Reduction in the number of socket rejected is: $0,3 \% \times 2.120.500 = 6.361,5$ products

Unit price is: 9.805 VND

Saving of waste is: $6.361,5 \times 9.805 = 62.374.507,5$ VND

Product 2: Wires/cables:

There's no calculation to be done as the waste from production of this kind of product can be considered as negligible.

Financial impact for indicator 3: 62.374.507 VND

Indicator 4: *Replacement costs for non-functional products*

Product 1: Sockets

In case of using standards, the rate for replacements due to product failures is about 1 ‰, while in cases when no standards are used, this rate is about 2 ‰ This means the rate was reduced 1‰

Number of sockets sold every month is 240.000 and every year is:

$$240.000 \times 12 = 2.880.000 \text{ units}$$

The reduction of the number of products that have to be replaced for customers is:

$$2.880.000 \times 1 \text{ ‰} = 2.880 \text{ units}$$

$$\text{Value of 2.880 sockets is: } 2.880 \times 9.805 = 28.238.400 \text{ VND}$$

These 2.880 sockets are not thrown away, but some can be repaired and reused. It is estimated that the average costs for repair are about 18% of the value of these sockets. This means that the company can save costs of about:

$$\mathbf{28.238.400 \times 18 \% = 5.082.912 \text{ VND}}$$

Product 2: Wires/Cables

There is no calculation done for this indicator as this costs can be considered to be negligible.

Financial impact for indicator 4: 5.082.912 VND

Indicator 5: Reduction cost of testing final products

Product 1: Sockets

The frequency of testing the final product is always 3/500.000, which means there is no difference between using standards and not using standards.

Product 2: Wires/Cables

At the start of the production, the frequency of testing was 3 times per day, using one sample each time, but due to the use of standards for products and materials the frequency was reduced to 1.

The company estimates that costs for testing are about 1 million VND per sample in case of testing inside the company (in case of testing at a laboratory outside, it costs about 6 million per sample).

Taking the case of testing inside the company, each day VINAKIP saves 2 million VND for testing when using standards which amounts to **700 million VND** a year.

Financial impact for indicator 5: 700.000.000 VND

Indicator 6: Saving cost relying on continuous improvement in production

The company applied a QMS in accordance with ISO 9001 since 2003, which includes initiatives for continuous improvement. So far there have been 195 initiatives of improvement, which on a yearly basis means there are about 30 initiatives on average. Each year the company spends 100.000.000 VND for prizes for these initiatives. According to the company rules the prize value is 2 % of the value that the initiative brought. It is therefore possible to calculate a total value resulting from the improvement activities for the company:

$$100.000.000 \times 1/0.02 = 5.000.000.000 \text{ VND}$$

We make the assumption that there are several factors that have an impact. However, we attribute 50% of the impacts of the savings to the QMS, that is the ISO 9001 standards. This amounts to a value of 2.5 billion VND.

Financial impact for indicator 6: 2.500.000.000 VND

Indicator 7: Saving materials in production

Product 1: Sockets

No data is available for this indicator.

Product 2: Wires/Cables

The company can save materials by using materials conformant to standards together with applying an automated production line. According to available statistic, the company can save 18 kg of PVC per day, which amounts to savings per year of $18 \times 365 = 6.570$ kg of PVC.

The price of plastic is 24.300 VND/kg, so the company can save annually: **$6.570 \times 24.300 = 159.651.000$ VND**

Financial impact for indicator 7: 159.651.000 VND

C. BUSINESS FUNCTION: RESEARCH AND DEVELOPMENT (R & D)

Indicator 8: Saving cost for writing internal specifications

By using existing external standards, the company can save money by not having to develop their own internal specification for materials, products, process etc.

Product 1: Sockets

At present, 18 national standards are applied for the design, production, testing, packaging and labeling of socket.

In case that there were no external standards available, the company would have to write their own specifications for at least the 18 national standards the company applies.

Product 2: Wires/Cables

At present, the company is applies 14 national standards for materials, final products, testing, packaging and labeling.

For the two products, the company uses 32 national standards in its activities besides some IEC standards that are used directly for reference.

The cost for writing technical documents themselves would force the company to undertake the following activities:

- Investigation of current products in the market
- Collection of existing technical documents (which could be international standards, foreign standards and internal standards of other companies, as well as other related documents)
- Translation, if needed
- Testing
- Hiring of technical experts for the drafting and meetings to prepare the relevant documents
- Trial production, and

- other activities

According to experts from VSQI, for complex standards these costs may reach about 50 million VND and for more simple standards the costs are about 30 million VND. We can therefore calculate an average cost for writing one document to be in the order of 40 million VND.

This means that the company can currently save money by using external standards instead of having to write its own specifications in total: $40.000.000 \times 32 = 1.280.000.000$ VND.

Note: These are one-time and not recurrent savings.

Financial impact for indicator 8: 1.280.000.000 VND

D. BUSINESS FUNCTION: SALES AND MARKETING (S & M)

Indicator 9: *Increasing revenues due to improving customers confidence by using standards*

By using standards, VINAKIP can improve the confidence of its customers in the quality of the products and this contributes to the increase in revenue of the company.

Product 1: Sockets

For sockets, the company estimates the impact of standards on revenue increase to be around 8 % out of 200 % in total.

In 2010, the number of sockets sold was 2.880.000 units and the price per socket was 12.128 VND

Revenue in 2010 was: $2.880.000 \times 12.128 = 34.928.640.000$ VND

Revenue in 2009 was: 17.464.320.000 VND

The revenue increase by using standards is:

$17.464.320.000 \times 8\% = 1.397.145.600$ VND

Product 2: Wires/Cables

For wires/cables, the revenue in 2010 increased by more than 300% in comparison to 2009. This is caused by many reasons (marketing, increase in customers and others). The company estimates that the contribution of standards to the increase in sales is around 20 %.

Revenue of Wires/Cables in 2010 was 37 billion VND, in 2009 it was 12 billion VND.

So by using standards the company could increase its revenue by:

$20\% \times 12 \times 10^6 = 2.400.000.000$ VND

The total revenue increase for the two products by using standards was:

$1.397.145.600 + 2.400.000.000 = 3.797.145.600$ VND

Financial impact for indicator 9: 3.797.145.600 VND



Annex 3: Calculation of inflation-adjusted EBIT impacts from standards

Principles of the calculation

Due to the relatively high inflation rates over the recent years, it was necessary to adjust revenues of the chosen company and the EBIT impacts of standards for the inflation rates. The inflation rates are based on the CIA World Factbook with information obtained using the http://www.indexmundi.com/vietnam/inflation_rate_%28consumer_prices%29.html as the source.

To ensure comparability for the financial values, the revenues have been **adjusted to 2005 prices**.

Year	Inflation rate	Inflation factor	Calculation of the inflation factor
2005	9.5%	1	1
2006	8.3%	1.083	1 + 0.083
2007	7.5%	1.006225	1 + (0.083*0.075)
2008	8.3%	1.000516675	1 + (0.083*0.075*0.083)
2009	24.4%	1.000126069	1 + (0.083*0.075*0.083*0.244)
2010	7%	1.000008825	1 + (0.083*0.075*0.083*0.244*0.07)

The inflation adjustment is calculated applying the formula for the calculation of the present value, which is as follows:

For year 1 (2006): Present value = Future value / (1 + % (inflation_year_1))

For year 2 (2007): Present value = Future value / (1 + % (inflation_year_1 * inflation_year_2))

Adjustment of the values of the EBIT impacts of standards

In line with one of the assumptions of the ISO methodology, the impact of standards is assumed to last on average over a five year period. After this time, the standards become part of the “regular” operations of an organization and it is no longer appropriate to estimate impacts (unless due to news ways of leveraging already implemented standards or the implementation of new editions of already implemented standard, it is possible to obtain benefits which formerly may have not been possible to achieve).

In the focus of the assessment two types of products have been selected, electrical sockets a type of product for which manufacturing in VinaKip started in the 1990s and cables/wires, the production of which started in VinaKip in 2008. In order to allow the calculation of impacts of standards on the basis of available data, we calculate for simplicity reasons the impacts for electrical sockets for the last five years, i.e. the period between 2006 and 2010. The impacts of standards for cables/wires became visible - with the start of the production - only in 2008. It is expected that benefits will continue until and including the year 2012 (the end of the five-year cycle).

If we look at the available data based on the set of 9 indicators defined in the assessment, we have the following situation:

No	Related business function / Type of data expressed by this indicator	Indicators	Impacts: SOCKETS [in 2010 prices]	Impacts: CABLES [in 2010 prices]
1	Procurement Type: Average savings per year	Reduction in costs for supplier management	data not available (n.a.)	n. a.
2	Inbound logistics Type: Average savings per year	Reduction in costs for materials testing	10.225.000	n.a.
3	Production Type: Average savings per year	Reduction of waste (i.e. materials that have to be disposed of and cannot be re-used or repaired)	62.374.507	n. a.

4	Production Type: Average savings per year	Replacement costs for non-functional products (warranty)	5.082.912	n. a.
5	Production Type: Average savings per year	Reduction in costs in testing final products	no impact	700.000.000
6	General [relates to production] Type: Average savings per year	Continuous improvements in production	2.500.000.000	
7	Production Type: Average savings per year	Savings of materials in production	n. a.	159.651.000
8	Research & Development Type: One time saving (*)	Savings due to not having to write specifications internally	256.000.000	
9	Sales & Marketing Type: Average sales revenue increase per year	Increases in revenues due to improved confidence of customers due to the use of standards	1.397.145.600	2.400.000.000

(*) The total impact of indicator 8 is valued at 1.280.000.000 VND. This is a one-time benefit, not an annual benefit. To simplify the calculation, the impact is spread over five years with an annual average of 256.000.000 VND.

Calculation of EBIT impacts of standards over the period 2006 to 2010 (inflation-adjusted)

Calculation of inflation adjusted impacts of standards - SOCKETS

Sockets		Indicator 2: Reduction in costs for materials testing		
Year	Annual impact	Inflation factor	Inflation adjusted impact	
2006	VND 10 225 000.00	1.083	VND 9 441 366.57	
2007	VND 10 225 000.00	1.006225	VND 10 161 743.15	
2008	VND 10 225 000.00	1.000516675	VND 10 219 719.73	
2009	VND 10 225 000.00	1.000126069	VND 10 223 711.11	
2010	VND 10 225 000.00	1.000008825	VND 10 224 909.77	
Sum			VND 50 271 450.33	
Sockets		Indicator 3: Reduction of waste		
Year	Annual impact	Inflation factor	Inflation adjusted impact	
2006	VND 62 374 507.00	1.083	VND 57 594 189.29	
2007	VND 62 374 507.00	1.006225	VND 61 988 627.79	
2008	VND 62 374 507.00	1.000516675	VND 62 342 296.29	
2009	VND 62 374 507.00	1.000126069	VND 62 366 644.52	
2010	VND 62 374 507.00	1.000008825	VND 62 373 956.56	
Sum			VND 306 665 714.46	
Sockets		Indicator 4: Replacement costs		
Year	Annual impact	Inflation factor	Inflation adjusted impact	
2006		1.083	0	
2007		1.006225	0	
2008		1.000516675	0	
2009		1.000126069	0	
2010		1.000008825	0	
Sum			0	
Sockets		Indicator 5: Reduction in costs for final testing		

Year	Annual impact	Inflation factor	Inflation adjusted impact
2006	VND 5 082 912.00	1.083	VND 4 693 362.88
2007	VND 5 082 912.00	1.006225	VND 5 051 466.62
2008	VND 5 082 912.00	1.000516675	VND 5 080 287.14
2009	VND 5 082 912.00	1.000126069	VND 5 082 271.28
2010	VND 5 082 912.00	1.000008825	VND 5 082 867.14
Sum			VND 24 990 255.07

COMMON		Sockets & Cables		Indicator 6: Continuous improvements in production	
Year	Annual impact	Inflation factor	Inflation adjusted impact		
2006	VND 2 500 000 000.00	1.083	VND 2 308 402 585.41		
2007	VND 2 500 000 000.00	1.006225	VND 2 484 533 777.24		
2008	VND 2 500 000 000.00	1.000516675	VND 2 498 708 979.54		
2009	VND 2 500 000 000.00	1.000126069	VND 2 499 684 867.98		
2010	VND 2 500 000 000.00	1.000008825	VND 2 499 977 938.17		
Sum			VND 12 291 308 148.34		

Sockets		Indicator 7: Savings of materials in production	
Year	Annual impact	Inflation factor	Inflation adjusted impact
2006		1.083	0
2007		1.006225	0
2008		1.000516675	0
2009		1.000126069	0
2010		1.000008825	0
Sum			0

COMMON		Sockets & Cables		Indicator 8: Savings due to use of external specifications	
Year	Annual impact	Inflation factor	Inflation adjusted impact		
2006	VND 256 000 000.00	1.083	VND 236 380 424.75		
2007	VND 256 000 000.00	1.006225	VND 254 416 258.79		
2008	VND 256 000 000.00	1.000516675	VND 255 867 799.50		

	2009	VND 256 000 000.00	1.000126069	VND 255 967 730.48
	2010	VND 256 000 000.00	1.000008825	VND 255 997 740.87
Sum				VND 1 258 629 954.39

Sockets		Indicator 9: Sales & Marketing		
Year	Annual impact	Inflation factor	Inflation adjusted impact	
2006	1397145600	1.083	VND 1 290 069 806.09	
2007	1397145600	1.006225	VND 1 388 502 173.97	
2008	1397145600	1.000516675	VND 1 396 424 102.58	
2009	1397145600	1.000126069	VND 1 396 969 485.87	
2010	1397145600	1.000008825	VND 1 397 133 270.57	
Sum			VND 6 869 098 839.08	

Calculation of inflation adjusted impacts of standards - CABLES/WIRES

Cables/Wires		Indicator 5: Reduction in costs for final testing		
Year	Annual impact	Inflation factor	Inflation adjusted impact	
2008	VND 700 000 000.00	1.000516675	VND 699 638 514.27	
2009	VND 700 000 000.00	1.000126069	VND 699 911 763.03	
2010	VND 700 000 000.00	1.000008825	VND 699 993 822.69	
Sum			VND 2 099 544 099.99	

Cables/Wires		Indicator 7: Savings of materials in production		
Year	Annual impact	Inflation factor	Inflation adjusted impact	
2008	VND 159 651 000.00	1.000516675	VND 159 568 554.92	
2009	VND 159 651 000.00	1.000126069	VND 159 630 875.54	
2010	VND 159 651 000.00	1.000008825	VND 159 649 591.12	
Sum			VND 478 849 021.58	

Cables/Wires		Indicator 9: Sales & Marketing		
Year	Annual impact	Inflation factor	Inflation adjusted impact	
2008	VND 2 400 000 000.00	1.000516675	VND 2 398 760 620.36	
2009	VND 2 400 000 000.00	1.000126069	VND 2 399 697 473.26	
2010	VND 2 400 000 000.00	1.000008825	VND 2 399 978 820.65	
Sum			VND 7 198 436 914.26	

TOTAL IMPACTS OVER THE PERIOD 2006 - 2010 FOR THE TWO PRODUCTS

Year	Sockets	Cables/Wires	Common impacts	Total (VND)
2006	VND 1 361 798 724.84	VND 0.00	VND 2 544 783 010.16	VND 3 906 581 735.00
2007	VND 1 465 704 011.53	VND 0.00	VND 2 738 950 036.03	VND 4 204 654 047.55
2008	VND 1 474 066 405.74	VND 3 257 967 689.54	VND 2 754 576 779.04	VND 7 486 610 874.33
2009	VND 1 474 642 112.79	VND 3 259 240 111.84	VND 2 755 652 598.46	VND 7 489 534 823.08
2010	VND 1 474 815 004.04	VND 3 259 622 234.46	VND 2 755 975 679.04	VND 7 490 412 917.54
Sum	VND 7 251 026 258.93	VND 9 776 830 035.84	VND 13 549 938 102.73	VND 30 577 794 397.49

TOTAL IMPACTS FOR THE INDICATORS OVER THE PERIOD 2006 - 2010

	Sockets	Cables/Wires	Common impacts	Total
Total indicators 2 - 9	VND 7 251 026 258.93	VND 9 776 830 035.84	VND 13 549 938 102.73	VND 30 577 794 397.49



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