CHEMICALS
IN VIETNAM
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- Gartner

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I. OVERVIEW

Vietnam is the agricultural country, one of the main duties is to provide sufficient amount of agrochemical products such as fertilizers, insecticide, minerals for the homebred animals... As a result, organic and inorganic chemicals are very important for the development of country, making the whole chemical industry of Vietnam especially crucial; however this sector is still undeveloped. Compared to the development of chemical industrial sector of another country, the growth rate of Vietnam is still low, plus having unbalanced development between areas: South 55%, North 40%, Central only 5% (industrial product value). Furthermore, Vietnam's chemical production technologies are considered backward compared to the world in general. Its chemical products have lower competitive capability compared to regional countries and Vietnam also have lower awareness to chemical risks. This leads to loss of natural resources and the country faces severe environmental pollution issues. At present, Vietnamese chemical market occupies approximately 0.5% of the international market.

II. PORTRAIT OF THE CHEMICAL INDUSTRY IN VIETNAM

1. Annual Growth Rate Average

In comparison with other nations in Asia, Vietnam’s annual economic growth rate is still high and always above the average growth, even in financial crisis times during the last decade.

Overall economic growth, 1986-2010
Per capita GDP, PPP1 terms, indexed (1986 = 100)

<table>
<thead>
<tr>
<th>Year</th>
<th>China</th>
<th>Vietnam</th>
<th>India</th>
<th>Thailand</th>
<th>Singapore</th>
<th>Malaysia</th>
<th>Indonesia</th>
<th>Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1988</td>
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<td></td>
</tr>
<tr>
<td>1990</td>
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<tr>
<td>2000</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compound annual growth rate, 1986-2010

Vietnam 5.3
India 7.7
China 7.7
Thailand 4.4
Singapore 4.0
Malaysia 3.8
Indonesia 3.5
Philippines 1.7

1 PPP = Purchasing power parity

However, the growth of chemical industry is not as positive as the whole economy, but seeing constraint fluctuations for more than a decade from 1990 to 2012 with figures as followed:

Annual Growth Rate Average in Chemical Industry

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14%</td>
<td>10%</td>
<td>6%</td>
<td>15%</td>
<td>11%</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With unstable development, Chemical Industry, makes a very small contribution of only 10.5% and Industrial Production Value Sector Contribution also stand at this point, 10.5%.

<table>
<thead>
<tr>
<th>Average Annual Growth Rate</th>
<th>2012</th>
<th>Up to 2020</th>
<th>Up to 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14%</td>
<td>15 – 16%</td>
<td>15 – 16%</td>
</tr>
<tr>
<td>Sector Contribution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>● A round 10% Industrial Production Value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>● 10% Industrial Labor Force</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.8% Industrial Production Value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.8% Industrial Production Value</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Current sub-sectors of the Chemical Industry

The chemical industry is divided into a number of broad subsectors. Different classification systems provide different definitions of these subsectors, but they are nonetheless useful in drawing the broad outlines of the industry. The figure below provides a brief overview of these subsectors.

With up to 10 sub-sectors, the chemical industry in Vietnam also has Priority Sub – Sectors to best focus on the industry, namely:

- **Fertilizer**: is used to make plants grow faster. Most fertilizers supply just nitrogen, phosphorus and potassium because the other chemicals are needed in much lower quantities and are generally available in most soils. Nitrogen, phosphorus and potassium availability is the big limit to growth.

- **Petrochemical**: are chemicals made from crude oil and natural gas. There are over 4,000 products classified as petrochemicals used as a wax coating on such produce items as cucumbers, bell peppers, eggplant, potatoes, and citrus fruits.

- **Basic Chemicals**: (also referred to as bulk chemicals) compose the first tier of production. These include both organic chemicals (also referred to as petrochemicals), and basic inorganics. The bulk chemicals are sold within the chemical industry and to other industrial sectors, and are used to make an enormous variety of downstream products. Appendix A shows examples of bulk chemicals and their principal downstream products.

- **Pharmaceutical Chemistry**: is sometimes grouped together with agricultural chemicals in a category of — life sciences chemicals.

And the following main products: Fertilizers & Agrochemicals; Plastics; Basic Chemicals; Rubber Products; Household & Personal Care Products; Cells & Batteries; Cells & Batteries; Ind. Gases & Welding Electrodes; Paints & Pigments; Chemical Minerals; Petrochemicals; Pharmaceutical Chemistry.

3. Top Chemical Players on the Market

Up to now, there’s no official list of greatest chemical companies in Vietnam. The Vietnam Commercial Website recently has publicized top 19 chemical businesses, but given no categories or reasons of listing these companies as the top positions.

- **01** Vietnam National Chemical Group
- **02** Vietnam Rubber Group
- **03** Petro Vietnam Fertilizers and Chemical Cooperation
- **04** Ha Anh Import Export Joint Stock Company
- **05** Vietnam Plastic Corporation
- **06** Lam Thao Fertilizers And Chemicals JSC
- **07** Binh Dien Fertilizer Joint Stock Company
- **08** Southern Fertilizer Joint Stock Company
- **09** Vinacam Joint Stock Company
- **10** Techno- Agricultural Supplying Joint-Stock Company
- **11** An Giang Plant Protection Joint Stock Company
- **12** Agricultural Products and Materials Joint Stock Company
- **13** Unilever Vietnam International Company Limited
- **14** The Southern Rubber Industry Joint Stock Company
- **15** Dau Tieng Rubber Corporation
- **16** Dong Nai Rubber Corporation
- **17** Japan Vietnam Fertilizer Company
- **18** Nghe An Agricultural Supplying Joint Stock Company
- **19** Bayer Vietnam Limited Company
4. The Chemical Life Cycle

The chemical life cycle begins with extraction of raw materials; this includes mining, extraction of oil and natural gas, and other activities. These raw materials are then used in chemical manufacturing, processing or refining. Manufactured bulk chemicals are then combined with one another and used to make a wider variety of downstream chemical products. These chemical products may, in turn, be used as feedstock for chemical products further downstream; may be used for a variety of industrial activities and services as individual chemicals or in preparations; or may be used to make consumer products. At the end of the life cycle, chemicals may be released into the environment, recycled for continued use, disposed of in hazardous waste facilities, or disposed of in other ways. Products containing chemicals, similarly, may be reused, recycled, or disposed of in municipal solid waste, in hazardous waste facilities, or through informal waste disposal systems. At each stage of the chemical life cycle, there are opportunities for exposure. Occupational and environmental exposures can occur during raw material extraction, during bulk and downstream chemical manufacturing and processing, during use of chemicals or chemical-containing products, and during recycling or disposal. The figure below shows the chemical life cycle with a focus on consumer products, and illustrates the opportunities for human and environmental exposure that exist at each stage.

From the above chart, it can be seen that Chemical Industry obviously releases lots of wastes and have a great impact on the surrounding environment. What ultimately determines how humans and ecosystems are exposed to toxic chemicals is defined by their life-cycle characteristics. Releases of substances not only occur during chemical production but also during the use of products containing chemicals, and finally at their disposal. Life-cycle thinking promotes an integrated approach to the sustainable production and consumption of such substances.

The entire life cycle of resource use, from extraction and production/manufacture through consumption/use to post-consumption disposal, produces undesirable environmental impacts from emissions and wastes. These impacts can include unintended side effects such as endocrine disruption, which directly interferes with growth and development in most animals, and can also affect people (WHO 2002). Life-cycle analysis helps understand such impacts, but, while a useful tool, it can be extremely complex. Too often, when problems are identified, shifts to alternative chemicals that have the same intended properties may result in further unexpected or undesirable outcomes.

The latest materials to raise concern are those arising from synthetic biology and engineered nano-materials. With the accelerated pace at which new technologies and chemicals are being deployed, a different approach is needed in which their implications are systematically and comprehensively assessed before they reach production. The use of green chemistry principles in chemical design and the adoption of clean production processes may help to prevent problems at a later stage. While this is happening in some parts of the world through the use of exposure models, life-cycle analysis has yet to become a universal systematic approach. This may well require new forms of international governance. The high number and diversity of chemicals and the complexity of their life cycles inevitably lead to a situation where the scientific understanding of the impacts of chemicals, and the regulatory schemes used to manage them, lag behind technological and economic developments.
A recent study by the World Health Organization (WHO) indicated that 4.9 million deaths were attributable to environmental exposure to chemicals in 2004. Indoor smoke from the use of solid fuels, outdoor air pollution and second-hand smoke are among the most critical causes. The study concluded that the known burden of chemicals, while considerable, is an underestimate because data on many chemicals are scarce. Furthermore, a vast majority of sea area in many countries has been contaminated due to the operation of chemical enterprises, which is clearly shown in the following diagram.

According to the chart, many nations have to suffer from marine pollution. The oceans cover 71 per cent of the Earth’s surface and are polluted to varying degrees, threatening marine life, fisheries, mangroves, coral reefs, and estuarine and coastal zones, with neuro-developmental disorders, endocrine disruption and carcinogenicity.
III. VIETNAM CHEMICAL PRODUCTION AND CONSUMPTION

1. Production and Domestic Consumption

Vietnamese chemical industry is still in its infancy stage where it only produces a limited variety of basic chemicals such as: H2SO4, NaOH, Cl2, H3PO4,... Chemicals for industrial use do not meet domestic demand and are only sufficient for pesticide production and several basic goods. Pure and special chemicals haven’t been produced in Vietnam. Chemicals for pesticide production are mainly imported; Medicines and chemicals for household product production are imported nearly 100%. Ninh Binh Fertilizer, Ha Bac Felizer, Bien Hoa Chemical Plants, TPC Vina... are the famous mid-sized chemical plants in Vietnam.

Regarding Pharmaceutical Industry, Vietnam is a large and fast growing population, which is expected to reach 96 million by 2019. Rising drug consumption and government investment make Vietnam an attractive pharmaceutical market. Health ministry statistics show that the country’s total medicine consumption value was more than US$2.43 billion in 2011, of which only $1.14 billion, or less than half, came from domestic medicine. The average drug expense per capita was $27.6 last year. The Ministry of Health forecast that the size of the Vietnam pharmaceutical market will exceed US$2.0 billion and annual growth will reach between 17-19 percent in 2012. Globally, Vietnam ranks 66th out of 83 countries surveyed in our ever-expanding pharmaceutical universe.

2. Export

During five years, the export quantity of chemicals in Vietnam is still a bit low in comparison with other areas worldwide. From 2005 to 2010 also, our economy has experienced a great change in major export sectors, with trends mainly focusing on developing fashion and electronic industry.

Export breakdown by subsector %; $ billion

<table>
<thead>
<tr>
<th>Product group</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Energy and mining</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>Food and beverages</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Chemicals</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Textiles</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>Vietnam</td>
<td>159</td>
<td>173</td>
</tr>
</tbody>
</table>

2005

<table>
<thead>
<tr>
<th>Product group</th>
<th>Enterprises</th>
<th>Capacity</th>
<th>To meet the demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>69</td>
<td>7.590.000 ton/year</td>
<td>78%</td>
</tr>
<tr>
<td>Plant protection chemical</td>
<td>93</td>
<td>60.000 ton/year</td>
<td>15%</td>
</tr>
<tr>
<td>Petrochemicals</td>
<td>11</td>
<td>1.013.000 ton/year</td>
<td>100%</td>
</tr>
<tr>
<td>Basic chemicals</td>
<td>25</td>
<td>1.836.000 ton/year</td>
<td>100%</td>
</tr>
<tr>
<td>Chemical powers</td>
<td>26</td>
<td>20.000.000 kWh</td>
<td></td>
</tr>
<tr>
<td>Industrial Gases</td>
<td>41</td>
<td>68.000 m3/h</td>
<td>100%</td>
</tr>
<tr>
<td>Rubber products</td>
<td>154</td>
<td>895.000 ton/year</td>
<td>70 – 75%</td>
</tr>
<tr>
<td>Detergents</td>
<td>103</td>
<td>800.000 ton/year</td>
<td>Meet the demand in the domestic market</td>
</tr>
<tr>
<td>Paints and printing inks</td>
<td>143</td>
<td>300.000 ton/year</td>
<td>70%</td>
</tr>
<tr>
<td>Pharmaceutical chemicals</td>
<td>6</td>
<td>500 ton/year</td>
<td>&gt;90% is imported</td>
</tr>
</tbody>
</table>

Total (to the end of 2012) : 671

Source: www.cuchoachat.gov.vn

1. Includes electric equipment, electronic products, and general machinery and equipment.
2. Including Indonesia, Malaysia, the Philippines, and Thailand.

NOTE: Numbers may not sum due to rounding.

Source: Global Insight 2011; McKinsey Global Institute analysis

Goods export performance by product type, 2005 - 10

Total global value in export markets

Compound annual growth rate (%)

<table>
<thead>
<tr>
<th>Product group</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel and oil</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Toys and sports</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Paper</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Others</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Wood</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Cereals and glassware</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Textiles</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Industrial machinery</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Electric equipment</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Rubber</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Coffee, tea, sugar, and</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>spices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footwear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hides, furs, and leather</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hides, furs, and leather</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereals and glassware</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial machinery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Change in Vietnam’s share of global export market, 2005-10

Source: Comtrade 2011; McKinsey Global Institute analysis

Percentage points

Source: www.vietnamsupplychain.com
Therefore, Vietnam’s export of chemical products didn’t undergo any substantial increase. In the first quarter of 2014, our chemical export only stood at 79.07 million U.S. dollars with 19 markets across the world, according to the information center of the Ministry of Industry and Trade. Among them, Japan was the largest importer of Vietnamese chemicals with 13.53 million U.S. dollars. Malaysia came second with nearly 7.78 million U.S. dollars. These figures bear no considerable resemblance with 2012, when Japan was also our largest importer.

3. Products containing chemicals

As consumption of a wide range of products increases over time, these products themselves become a significant vehicle increasing the presence of chemicals in developing and transition economies. Emissions from products pose different management challenges from those associated with manufacturing, as they are diffused throughout the economy, rather than being concentrated at a limited number of manufacturing facilities.

The universe of products containing chemicals can be divided into categories. One important category consists of liquid chemical products packaged for sale directly to consumers. These include products such as detergents, bleaches, other chemicals used in laundering clothing, as well as personal care products such as fragrances. Unlike other chemical industry products, these products are packaged for direct sale to consumers, and brand differentiation can be an important aspect of these products’ commercial success.

Developing and transition economies have been identified as important areas for growth by leading companies selling household chemicals and consumer products. For example, a recent statement by a leading household chemical and personal care products company noted that the Asia-Pacific region accounted for 16% of the company’s global revenues, and that the importance of the region is expected to continue growing as incomes rise.

Another is the broad category of articles: products whose function is determined primarily by shape, as opposed to depending primarily on chemical composition. Articles ranging from textiles to electronics, from building materials to toys, all contain chemicals and can be important vehicles through which chemicals move through economies.
IV. CHEMICAL MANAGEMENT POLICY IN VIETNAM

Currently the Chemical Industry is under the control of 6 governmental organizations

Besides being controlled by the six government organizations above, chemical firms’ operations also depend a lot on the Chemical Control Legislation, which includes: Environmental Protection Law, Health Care Law, Safety Code for production, use, storage and transportation of dangerous chemicals, Narcotics (drug, heroin) Prevention Law; Radiation Safety Law, Ordinance on Plant Protection, Prime Minister’s Decision on Controlling Petrol, oil and LPG, Food Safety Law and finally Chemical Law.

Some Decrees from the Government
- Decree No. 108/2008/ND-CP dated October 2008 on “Detailed regulation and guideline of implementation of several articles in Law of chemicals”.
- Decree No.90/2009/ND-CP dated October 20th, 2009 on administrative punishment of chemical activity.
- Decree No.26/2011/ND-CP dated April, 8th, 2011 on “Repair some articles of Degree No. 108/ND-CP on guideline of implementation of several articles in Law of chemicals”
- Decree No.26/2011/ND-CP dated April, 8th, 2011 on “Repair some articles of Degree No.108/ND-CP on guideline of implementation of several articles in Law of chemicals”

Circular from the MOIT
- Circular 30/2011/TT-BCT dated August 10th, 2011 stipulating temporarily the permissible content limitation of some hazardous chemicals in the electronic, electrical products.
- Circular 40/2011/TT-BCT dated November 14th, 2011 guiding on chemical declaration.
- Circular 04/2012/TT-BCT dated February 13th, 2012 guiding on chemical category and labeling

Chemical management activities in cooperation with SAICM, APEC, AMEICC; KEMI (Sweden); METI (Japan) and KOICA (Korea)
- Chemical management project with UNDP/SAICM;
- Project «Survey of Mercury Management in Vietnam» with UNEP;
- Chemical Management Forum for Indochina countries with KEMI;
- Information Center for REACH and ROSH with UNIDO;
- Chemical management projects with METI, Japan under MOC between MOIT and METI
- Chemical management in accordance with international conventions: Kyoto Protocol; Stockholm Convention (POP convention); Chemical Weapon Convention; Vine Convention & Montreal Protocol on ODS; Rotterdam Convention.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Basic chemicals</th>
<th>Pesticides</th>
<th>Pet. medics</th>
<th>Rad. materials</th>
<th>Exp. Mater.</th>
<th>Medical drugs</th>
<th>Food additives</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOIT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MARD</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MOH</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>MOST</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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<tr>
<td>MONRE</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
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<td>MOD</td>
<td>X</td>
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</tr>
<tr>
<td>Peop. Comm.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

MOIT: Ministry of Industry and Trade
MARD: Ministry of Agriculture and Rural Development
MOH: Ministry of Health
MOST: Ministry of Science and Technology
MONRE: Ministry of Natural Resource and Environment
MOD: Ministry of Defense
Peop. Comm: People Committee
V. CONCLUSION

From the above analysis, some challenges to our Chemical Industry can be drawn out as followed:

- Lack of technical guideline: although there has been Government Decree of chemical safety and that comes into force already, but because still lacking guidelines for implementing the certain items.
- Overlap of activities: because of a lot of stakeholders (ministries) involved in the chemical management and chemical safety in a not clear mechanism of duty or responsibilities allocation, the response ways of the relevant bodies to the management requirements could be quite passive, not active.
- The legal provisions are not enough strict. Chemical inspection: have not been given due attention
- Awareness of the business on the chemical safety remains low
- Coping skills of workers is not good
- Equipment and manpower to response for chemical accident: not good.
- Chemical breakdown of the chemical industry of Vietnam occurred more.

However, all of these difficulties can be easily tackled down when chemical firms take the problems into account and find more ways.

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9. Vietnam.exportersindia.com
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DYNAMIC STORAGE

Interroll dynamic storage helps you save up to 50% space and energy

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