
The Global Petrochemical and Plastics Technology Services - Outsourcing - Trends and Impacts

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**Presented at SPE Polyolefins RETEC
Houston, TX February 22-24, 2010**

Introduction

The Global petrochemical industry has gone through major changes in the last decade including: (1) feedstock issues, (2) Globalization of demand, (3) industry maturity and (4) the most recent recession. One of the major impacts felt by the industry is the increased outsourcing of technology and high value added jobs to developing countries.

Petrochemical industry is essentially driven by three major factors: (1) feedstocks, (2) labor and (3) capital.

Being a high capital intensive industry, chemical industry is facing a tough competition for capital from the low capital intensive industries like,, information technology, services, financials etc., Very few would want to invest for 30 year returns when they can double their investment instantaneously in the service industry. The second major input for the Chemical industry, the feedstock availability is regional and distributed randomly with low entropy.

With the maturity of the industry and declining technology/innovation in the traditional chemical industry – the developing countries, that have the labor and natural resources, have started to catch-up and some cases exceed in technology due to availability of highly skilled labor in a sustainable fashion.

The increased advantage of (1) capital, (2) feedstocks, (3) educated workforce from the developing countries have increased the Global outsourcing.

The overall objective of this article is to critically examine the impact of high technology outsourcing trends to illustrate their impact on: (1) outsourcing organizations, (2) host countries, (3) future impacts on displaced high technology workers in the developing countries and (4) options for the future direction.

Most of the discussions will focus on the Global Petrochemicals and Plastics.. Specifically on polyolefins industry .. that represents more than 67% of the Global plastics ..

Global Industry Current Status

The chemical industry, from its inception, had been a regional industry due to early stages of technology. The modern chemical industry, as we know it stated in Europe based on coal as the primary raw material. Following Allied victory in the second world war, the industry transitioned to U.S – based on natural gas and oil based naphtha. Rest of the world, with the exception of Middle East preferred naphtha.



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The Global chemical industry prices are indirectly pegged to oil prices – because of the competition between natural gas and oil as the sources of energy, even though less than 1.4% of a barrel of oil is used in petrochemical manufacturing.

Most of the oil and natural gas availability in the world is regional and it is natural for the industry to pursue feedstock advantage strategy – movement to friendly oil regions. The definition of “friendly”, at best being a subjective interpretation.

The investment scenario in the developed countries –especially in U.S, W Europe and Japan is under severe competition from computer and information technology (stock prices and increase thereof..)

One of the major impacts of information technology has been the “Knowledge Transfer” and the increased emphasis in developing countries towards “prosperity equalization”. Both these mega trends have resulted in increased knowledge workers (science and technology graduates), thus providing optimum supply of high skilled labor at a lower rate in a sustained fashion – a precursor to “ High Skilled Sweat Shops” currently practiced worldwide – people remain in the country to work for foreign corporations for the benefit of foreign corporations.

Based on these trends – most major petrochemical companies Globally have

used the strategy of “Asset Light – Feedstock Advantaged Migration to Developing regions of the world”. China has been a major influencer in the world during this phase with its double digit demand growth combined with increase in production capacity.

Middle East (Saudi Arabia and GCC) have influenced the world with the feedstock and investment advantage – but lacked demand. The demand in China and Europe were the primary targets for the Middle East capacities.

India – growing at 7-9% GNP, remained a knowledge based nation with growing middle class – starting from a small consumption. The Indian chemical industry did not have a major impact on the world, with the exception of Reliance Industries, with their impetus on Global growth and export opportunities. Speculations aside, India in spite of all its developments, may not be a major

influencer on the petrochemical and plastics consumption .

The above trends of 2005-08 were perturbed by the Global recession resulting from: (1) real-estate related financial crisis in the U.S, (2) slowdown of post-Olympic Chinese demand and (3) Global recession created by financial policies.

All of the three above factors resulted in a Global financial. The major impacts of the crisis include:

.....After a one-time fixed capital investment, availability of highly skilled labor, at low cost, continuous pace is key to the success of technology outsourcing ..



1. Organizations in the U.S went into survival mode by reducing innovation, employment and widespread cost-cutting measures.
2. All of the major organizations in the U.S have speeded up the “outsourcing” most of the technology, library, information system functions.
3. Most developing countries embraced the opportunity to provide intellectual services to the developed countries – Europe, Japan and U.S – albeit at a fraction of the cost.

These Global trends continued to the Plastics industry worldwide. .

Polyolefins represent nearly 67% of all the plastic materials in the world. Unlike other commodity plastics like PVC, Polystyrene and Engineering Plastics – polyolefins are more technology driven and than the others.

The polyolefin industry underwent major changes in technology and product offerings on a continuous basis, starting with LDPE, LLPE, Metallocene, PP elastomers etc.. and continues to be technologically superior product with more opportunities for the future.

This article discusses the Global impact of outsourcing on the plastics industry and polyolefins industry in particular

Globalization Overview

“Globalization”, for chemicals and petrochemicals, in terms of the expansion of markets and technologies

cutting across the geographical borders started - in the mid 80s.

Globalization – I

Industrial Globalization-I during 1987-1994 was Initiated by U.S and Japan to increase market participation in outside the developed countries (U.S, Europe and Japan). Since most countries of the world in the mid 80s lacked: (1) infrastructure for transportation, (2) investment capital and (3) technology – Both Japan and U.S and Europe to some extent started expanding to the rest of the world – as a means – increasing the market for their goods.

The region chosen for the market expansion was South East Asia, with the logic that any expansions in South East Asia will help in expansion to upcoming China markets.

However, the lack of infrastructure developments in Asia and the demand growth in SEA – in time to match the expected market expansions – ended in Asian Financial Crisis – Thus ending the Globalization I in 1994.

From 1994-98 time period,, organizations explored various regional programs including: (1) European Union, (2) Americas Strategy – North America (NAFTA), South America etc.. South East Asia was ignored to fend itself and come out of the crisis on their own.

Globalization II

The advent of internet and IT Revolution, initiated the communication based Globalization.

The Globalization II essentially driven by: (1) Y2K bug, (2) customer services



for banks, credit cards, on-line shopping, airlines etc., and (3) Financial, legal, library and medical services.

Globalization II, essentially helped the World avoid potential problems of Y2K and brought the whole world together in term of 24 hour services.

The Globalization II, also was driven by ability to pay for services – The whole world providing services for developed countries – U.S, Europe and Japan in a cost effective fashion.

Since the IT industry was still in infancy all over the world, the impact of jobs in the developed countries was minimal – Most new jobs were created in service provider countries – with less impact on the developed countries.

Globalization III

Globalizations I and II never impacted the high skilled labor professions, like R&D, consulting, technical services. These however paved the path in the developing countries to the realization that higher education and skills acquisition are the key to Global prosperity equalization. Thus an education revolution in Science and Technology propelled the developing countries to new heights.

The high skilled talent pool of developing countries, with the exception of consulting services, can now provide the technology support to the developing countries – at the same time increase the host country's technology status.

In the case of petrochemicals and plastics – this became more pronounced because of the diminishing investment

and feedstock advantages forcing them to follow Asset Light, Feedstock and High Skilled labor advantage based migration.

Globalization IV

The most recent Globalizations, especially based on IT and information services had a common factor of requiring English – the universal language as the primary requirement. Thus, making old British common wealth countries more adaptable to the information technology.

The newer Globalization now transcends English as a language barrier.

Global Outsourcing Overview

Definitions

Outsourcing ... Sending parts of work to outside to and bring back for internal use

Off-shoring ... Sending work outside to bring back the finished goods. This is most common in small and large appliances.. e.g., Assembled in Mexico

In-sourcing... Getting products and services from outside to benefit the current operations..

Off taking.., Import/export materials for value for a fee. ...

On-Site Off shoring . Bring temporary workers/operations as needed.., A common practice among top 8 consulting divisions of accounting/addicting firms.. This practice will become the norm in the future – it avoids labor issues in the recipient countries, but provides the tax



benefits for the outsourcing organization.

Overview

Outsourcing to improve the operations and profitability of an enterprise is an old concept. The World has witnessed various type of outsourcing in almost all of the businesses.

In the areas of plastics, the concept of outsourcing has been there since the late 70s.

Production of small plastic articles, shower curtains, miscellaneous molded goods, toys etc. were outsourced during the 70s because of their: (1) low cost/value, simple operations and labor orientation. It was generally determined that the operations would not be economical for the U.S. labor.

This progressed to complex plastic parts and components for automotive, appliances and medical applications – which were considered value added products, but still required low labor skills.

1980s witnessed a trend in outsourcing of Final Assembly of parts for auto, appliances and computers. While these operations were considered complex and highly skilled – the skill was still based on physical labor. The organizations outsourced the assemblies under carefully monitored conditions with extensive training.

1990s with advent of information technology developments, there was a surge in knowledge based outsourcing including: (1) Customer Support – Travel, cards, information processing, (2) Information Services; Accounting; Big 8 Consulting, (3) Professional and

Legal Services, (4) Technology services.

Among the plastic technology services the major functions included: (1) R&D, (2) TS&D, (3) customer service, and (4) Basic R&D

Plastics did not worry about most of the outsourcing until 2004/5, because most of the services for low skilled labor oriented applications

Host Countries for Outsourcing

Historically, the host nations that provided outsourcing opportunities changed with time. During the 1950s and 60s, Japan and Germany were the main countries for sensitive electronic applications including cameras, transistor radios, miniature electronics.

Taiwan and Hong Kong took over that function from Japan and Europe during the 60s and 70s, ultimately this spread to rest of the South East Asian countries including Philippines, Thailand, Malaysia etc.

China, essentially emerged as a leader in hosting outsourcing function in the 90s. The IT and information technology development required English as the primary language for customer service and communication. Thus, India, Ceylon, Singapore, Hong Kong and Malaysia being the common wealth (two centuries of British colonization) took over the outsourcing function – closely followed by Israel (U.S Ally) and African Nation of Nigeria.

New emerging nations for outsourcing knowledge based services include, Russia, Eastern Europe, Upper Middle East and Africa ,



Major Reasons for Outsourcing

Without exception, the number one reason for outsourcing is cost, and number one reason for the outsourced countries to accept the assignments is profit –at a lower local cost.

In addition to cost, several factors that determine outsourcing include: (1) Talent Pool, (2) Access to local markets, (3) Support for Local Production/Sales, (4) Favorable Tax Status, (5) Infrastructure support, (6) Favorable Government Policies and (7) Savings on R&D Costs.

Of all the costs, the tax savings aspects of the outsourcing are the least understood, yet the major driving factor. By law, the

corporations outsourcing their function to outside United States are exempted from paying corporate taxes on any gains overseas (approx 40%). For illustrative purposes a company with total revenues of \$1,000,000 and expenses of \$600,000 will have approximately \$260,000 in after tax profits. On the other hand, an organization that chooses to outsource the operations with the same sales and expenses will have \$400,000 after tax profits. This by far is the major driving factor for the U.S Corporations to outsource services.

.. Plastics Industry embraced Outsourcing for the last 30 years, for most of low skilled labor functions .. The outsourcing of Technology outsourcing is a Natural extension of the past.. and will continue..

Plastic Technical Services

Plastics industry – in particular, the polyolefins industry is very technical service oriented. In the plastics and elastomers the downstream processing methods vary with the specific end uses. Plastics industry spent more effort on R&D, technical services, training than most other sectors and continues to do so.

The general classifications of the technical services include: (1) Production Services, (2) TS&D – Technical Service and Development, (3) Product R&D – Product development, (4) Applied R&D – end use product development, (5) Basic R&D to develop new resins and concepts and (6) R&D Support Services – analytical, testing and benchmarking etc.. The next few

sections look at each of these services in depth..

Production Services

require - feedstocks; Investment, Technology, qualified talent, in addition to one time large infrastructure investment and a continuing source of cost effective labor

The impact of outsourcing is very prominent in the production area. Due to the apparent maturity, technology ceased to be a major differentiator or production – with investment capital and feedstocks becoming the important determinants along with growing



demand. Most Global organizations successfully implemented the Investment Asset Light – Feedstock Strategy to Demand growing regions of the world.

This migration started in the mid 200s is at the peak and essentially re-wrote the petrochemical industry as we know it.

TS&D – Servicing the Customer

Providing the technical services an opportunities to Development new products for the existing customer is one of the most important differentiators. To be able to provide the service, the organization has to be in the close proximity of the customers. In addition, understanding the needs of the customer and the impact of changes in market place are also important.

In mature regions and markets, TS&D is a major competitive differentiator. In the case of developing markets the product availability in a consistent fashion is more important than the TS&D. Hence the TS&D function will take some time to progress towards developing countries.

The organizations, however are already in motion to set up operations in Asia to provide the future TS&D to their customers.

Product R&D – Creating New Products for Existing Customers and New Customers

Product R&D, by nature involves lot of effort on the part of producers of the product and some of customer's technical group.

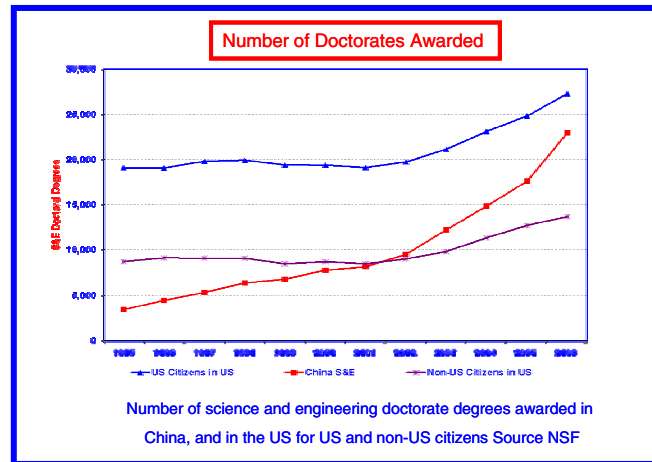
The product R&D requires one time large investment in infrastructure in

addition to maintenance of the organization.

Product R&D does not require proximity to the client, unless the client processing

is unique. In most cases this can be accomplished at the production site and later translated to the client site.

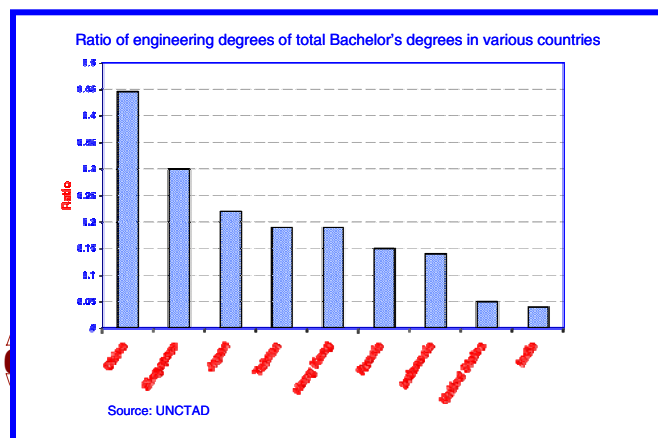
We anticipate some migration of these services in future



Applied R&D Creating New Applications

Applied R&D involves creativity and understanding the concepts of end uses for developing the existing and new end uses.

It involves extensive amount of creativity and applied knowledge. This function will move to developing countries rather slowly, since the applications required for the short time effectiveness have already been developed and available.



Basic R&D

Basic R&D for science and technology is one of the most vulnerable functions in the overall technology services..

Basic R&D has three major requirements: (1) time, (2) infrastructure

Exhibit 1

and (3) availability of skilled labor on a

Exhibit 2

sustained basis – All three forte' of developing countries.

Exhibits 1 and 2 present the skilled labor availability issues. The developing countries have a more emphasis on engineering and technology education compared to the developed countries at an economical cost.

Hence, we anticipate basic R&D will migrate fastest to the developing Nations in the next decade.

The outsourcing advantages include (1) large talent pool, (2) Global communications, (3) low cost infrastructure and a continued supply.

It is obviously the best choice for the organizations.

R&D Support Services – essentially follow the advantages of the Basic R&D and are well poised for the migration trends.

The talent of high skilled labor, consistent supply and availability are the major requirements.

Exhibit 3

The equipment, once installed can be operated by the skilled labor anywhere in the world and the results transferred effectively.

Just like the Basic R&D, the support services can provide excellent synergies for the organizations.

Exhibit 3 presents an overview of the individual services and their impacts on outsourcing with time.

Impact on Outsourcing Nations

The major impact of outsourcing is on existing jobs in the outsourcing nations –

.. The migration of steel industry.. did not bring down the United States as feared... Losing Technology jobs in Petrochemical Industry should not either,, U.S sill is the leader in Innovation.. ,, Time to Innovate and Stop focusing on Stock Holder Value Enhancement by manipulating Supply/Demand/Price..., ..

specifically in North America and Europe. Since, 2000, approximately 4 million jobs were lost to

this concept in the United States. According to University of California study, 11 million jobs will be lost in the next 15 years.

The current impact will be on high skilled labor jobs – something different from the past outsourcing trends, where only the low skilled jobs were affected.



These job/opportunities losses always had repercussions in the areas of unemployment, immigration, future opportunities – among others. However, the issues remained unresolved so far, because of lower economic impact.

With the impact on the skilled labor and educated workforce, the trends received much more attention among the people. The question on everyone’s mind is the progress of this process, when will it end and the future prospects.

The beneficiaries of the outsourcing revolution are, without a doubt – the general public. Since the 80s outsourcing was allowed to continue

Impact on Plastics Technical Services			
	2010-2015	2015-2020	>2020
Production	Moderate	Accelerated	
TS&D	Moderate	Accelerated	Less Need
Product R&D	Slow	Fast	Accelerated
Applied R&D	Slow	Slow	?????
Basic R&D	Moderate	Accelerated	Fast
R&D Support	Accelerated	Accelerated	Next Phase?

because it benefited the general public. It was less expensive to make PVC, ship the resin to Asia, convert to sheet goods, make shower curtains and transport back to U.S for sale than make it in the U.S. This process was allowed to continue because it benefited the general public in spite of few job losses in the plastics industry.

Similarly, independent of job losses in the skilled labor, the outsourcing trends have benefited more people. Off shoring benefits U.S consumers and shareholders through low cost goods and services and keeps them

competitive and innovative. The advanced countries will continue to benefit for a long term to come.

The trend will continue until the costs of job losses balance and/or exceed the benefits. This can happen in two ways: (1) the job losses would be severe

	Stage 1 Infancy	Stage 2 Emerging	Stage 3 Escalating	Stage 4 Established
Asia Pacific	Pakistan Korea	Malaysia Thailand Vietnam	China Philippines	Australia India Singapore
Americas	Brazil Chile Venezuela	Jamaica	Mexico	Canada
Europe Middle East Africa	Bulgaria Romania	Russia Ukraine	Czech Hungary Poland S. Africa	Ireland Israel UK

enough reduce the purchase power in the advanced Nations – an unlikely scenario; (2) the costs at the developing nations will continue to increase – making them uneconomical – an unlikely scenario since there are more countries ready to take the place of current leaders. Either way, the developing countries will continue to be the preferred customers for this outsourcing trends.

In summary, the high skilled labor outsourcing is beneficial for the general public in the developed countries and provides opportunities for growth in the developing countries and will continue for a long time to come.

The Advanced Nations will remain technologically superior and with effort can maintain their leadership. Losing Steel Industry in the 80s.. Did not bring down the U.S as everyone thought..



Impact on Host Nations

Exhibit 4 presents the current and anticipated host Nations for the outsourcing trends. The host nations embrace the outsourcing as a means of prosperity enhancement.

Outsourcing labor to developed countries is an old phenomenon.

Starting with the pre world war II Freundarbeiter (Friendly Workers) and post war Gastarbeiter (Guest Workers) programs outsourcing and/or onshore in sourcing have been very popular. These provided opportunities for the developing and poorer Nations a gainful

Exhibit 4

employment – same time providing

Source: UNCTAD Data
economic wonders for the developed Nations.

The 60s and 70s migration of educated and talented workforce impacted the developing Nations through “Brain Drain”. Talented brains from developing parts of the world migrated to provide services for developing countries. Different developing Nations handled the situation differently.

The current situation is a bit different in terms of on-shore off-shoring. The Brains stay put in the host Nation and the talent migrates to provide services for the advanced Nations. Most major big 8 financial and consulting firms use this approach by building huge organizations in developing countries to use them for their work in developing countries.

In the petrochemicals scenario, moving R&D and Technology centers to developing countries follows the same trends – tax free, low cost, higher skilled labor that will enhance the Stock value.

The major incentive for the developing countries for outsourcing is in the “Spill over” benefits. Many developing Nations saw their living standards go up with the spillover benefits.

Some of the negatives, which will be temporary include:

- (1) Two tier living standards - people who work for Multinational Corporations (MNCs) in general have a different cost structure and standard of living – that is unachievable for others.
- (2) High Inflation – caused by the faster increase of wages for a small group of population.
- (3) Unmanageable growth - The host nations have little to no control on the policies of the MNCs.. e.g., a major MNC decides to lay off thousands leaving the growth nightmare.
- (4) Increasing competition from other developing countries
- (5) The real talent of the Nation still provides services for overseas players instead of Domestic growth – Brain Exploitation in place of Brain Drain.

Conclusions

The Global outsourcing trends have always been driven by feedstock costs and labor costs, with technology as the factor of differentiation. For products and service that involved lower levels of technology the outsourcing was



considered acceptable. One of the major impacts of IT revolution is the is the effective and efficient transfer of technology across the borders. This is resulting in transfer of highly skilled labor based operations Globally.

Petrochemicals and Plastics industries have always used outsourcing for low skilled tasks in the past. The recent developments involving the “Asset-Light; LowCost Feedstock; High Skilled Labor “ strategies being embraced by every major organizations will result in a new type of outsourcing – Technology and Product Development – until recently the forte’ of the developed Nations.

This outsourcing trend is currently in an evolving stage with more to come. The Global organizations have to participate in the trend to be able to survive in the future markets..,

Author

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