

The Atomic Views of Flat Supply Chains in China

Sekhar Chattopadhyay
RMIT University, Australia
Corresponding author E-mail: sekhar.chattopadhyay@rmit.edu.au

Abstract: *China's domestic supply chain networks are getting flat and unbalanced despite its spectacular growth and rise to the enviable position in the global supply chain arena in recent times. The aftermath of continued investment explosion, especially in the coastal areas of the mainland, calls for an interwoven relationship of Chinese companies with the rest of the global supply chains. However, with new information and communication technologies, the real-time problems arising from this flattened supply chains are much more complex, multifaceted and multidimensional. China needs to re-think and re-focus on better alignment to the western values and cultures while managing its global business activities. This paper discusses four recently developed enterprise models in the light of several case studies conducted recently in Australia, China and India to characterise these new flat supply chains: People-Centric, Molecular Organization, Globally Dispersed and Disaggregated Value Chain. These, apparently different but inherently similar models have a vibrant architecture and system behaviour in their core and propose an alternative approach to address challenges of unbalanced domestic flat supply chains in China and helps the Chinese manufacturers to explore an approach to embrace Western values and cultures by enlarging their sphere of influence.*

Keywords: *Flat supply chain, Network of Networks, Sphere of influence, Reference Architectures, People centric, Molecular organisation, Globally Dispersed, Disaggregated Value Chain*

1. Introduction

The world changes a lot in an hour if not in minutes. Demanding and aggressive customer expectations also change. So does Supplier capacity. Change is eternal and therefore inevitable in all walks of life. The best supply chain for each given order will be created individually based on the order itself. Li & Fung's (2007) network of 8,300 suppliers stands ready like the famous Qin terra cotta soldiers that guard the emperor's grave in Xian. A specific supply chain is called forth in response to the demand of the customer at that moment. In a network-centric configuration of modern enterprises, knowledge workers are able to create and leverage information to increase competitive advantage through the collaboration of small and agile self-directed teams (Van Alstyne, 1997). To cope with these changes, the new, "flat" world is one where technology and collaborative economies have fostered equity in access of information for everyone working in the same business. Today, more people than ever are able to collaborate and compete for increasingly different kinds of work from diverse corners of the world. The flattening of the world means we are now connected with all the knowledge centres on the planet together into a single global network which has the possibility of ushering in an amazing era of prosperity and innovation. In a flat world, different societies and cultures come in much greater direct contact with one another before they can prepare themselves to achieve their missions. Some react to this by feeling threatened, frustrated and even

humiliated. The flattening of the world presents us with new opportunities, challenges and partners.

According to Friedman (2005) the enabling technology, individuals, and organizations skilled enough would take advantage of currently available new platforms along with the sudden influx of more than three billion people from the emerging economies onto this new, more levelled playing field. As China is benefiting from picking up the latest information technologies, the flattened world seems to have further flattened in China with the windfall of many new opportunities. This is a wake-up call to the West to better understand and respond to the enormous competitive threat posed by the Chinese manufacturers. Chinese companies have emerged in the era of a "Flat World," in which easily accessible global supply chain flows and dramatically reduced barriers to world trade provide a platform unavailable in earlier periods for the Chinese manufacturers to build market share world-wide (Zeng and Williamson, 2007).

Probably one of the tactical reasons to go to China is to be closer to the customer, which in this case would be the Asian market. When companies jump on the China ship they usually do it via collaboration with a Chinese company. When the systems were in place to move parts of the process to China, the process could now be moved to almost anywhere in the world. The old under-one-roof factory is broken wide open. The whole world is the factory in the 21st Century. As labour costs increased, the Chinese company sometimes found themselves

abandoned as their partner globe-trots to find a new even cheaper source of labour.

For this, the organization culture and structure need to change from a bureaucratic, if not, autocratic hierarchy to an adaptive and flexible hybrid enabling formation of bio-teams (where a decision can be made by any). In a constantly metamorphosing flattened world, rapid change in lightning speed causes disruption, shock and panic turning business environment upside down. Therefore enterprises in the 21st century need to renew, reinvent and reinvigorate themselves to respond creatively and patiently to the changes thrashed upon them by ever increasing customer needs and demands. The network-centric approach aims to tap into the hidden resources of unlimited potential and courage of the people – the lifeline of an enterprise, supported, enabled and enhanced by ICT, in particular the social technologies associated with Web 2.0 and Enterprise 2.0. This paper holds the view that a network-centric organization is more about people, culture and their mindset than technology. In fact the nervous system of our tiny global village is nothing but a finely threaded human network of networks - all pervasive and globally dispersed enveloping the society, economic and business.

2. Vibrant Architecture and System Behaviour

The risks of flat supply chains are:

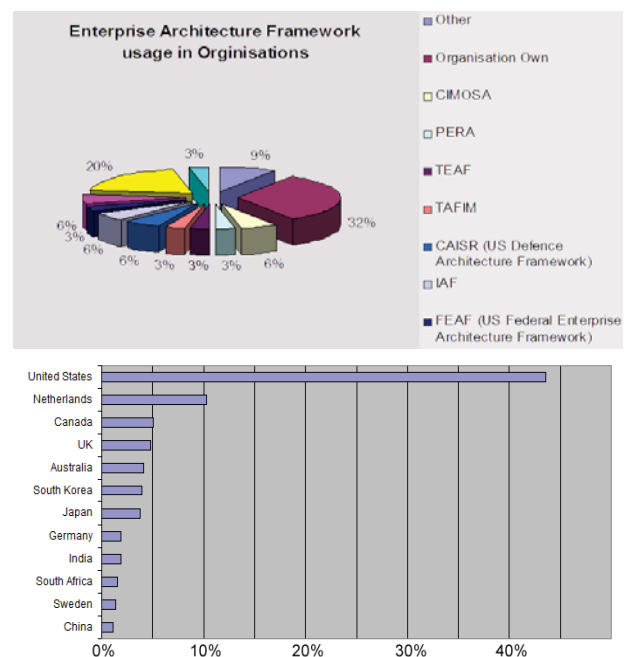
- Cost and non-availability of knowledgeable and properly trained people especially in remote areas
- Regulatory measures from various authorities
- Delays in transportation and material handling mechanisms
- Poor visibility down the supply chain due to misaligned business information system
- Higher interdependence on various chain members and inefficient decision support system

There are four internationally recognised Reference Architectures (Saenz and Chin-Sheng 2004). Computer Integrated Manufacturing Open Systems Architecture (CIMOSA), Purdue Enterprise Reference Architecture and Methodology (PERA), Generalized Integrated Methodology (GIM), and Generalized Enterprise Reference Architecture and Methodology (GERAM). GERAM is not yet-another-proposal for enterprise Reference Architecture (RA), but is meant to organize existing enterprise integration knowledge (Bernus et al, 2003).

If one looks for technology and/or information architecture driven solutions using these reference architectures for the solutions in flat supply chain management and execution, there are key challenges:

- Interoperability between disparate systems—data sharing, synchronization and regional solutions
- Poor visibility across decentralized and fragmented systems
- Data security for end-to-end chain of custody and so on.

A number of case studies were conducted recently in Australia, China and India encompassing industries in both manufacturing and service sectors in order to address the key flat supply chain challenges and issues with the help of enterprise modelling techniques as a tool. It is observed that there is a general lack of awareness and popularity in enterprise modelling efforts using the traditional Reference Architectures (RAs). One of the findings also suggests that RAs of the nineties are out of date for the business complexities of the 21st century and that is perhaps one of the possible reasons for poor uptake of these architectures by the industry (Fig.1). Statistical data by the IFEAD survey report (2005) also corroborates with the field study findings. The other finding is that majority of the organizations having their own architectures of ‘some sort’ already.



Source: IFEAD Report 2005

Fig. 1. Recent declining trend in Global Enterprise Architecture Usage

This opens up the opportunity and challenge for new, contemporary or even non-traditional enterprise modelling techniques. The four new models as proposed in this paper is a step forward towards enterprise modelling.

‘Supply chain visibility’ is emerging as a critical differentiator for companies to stay ahead of competition. The question is how a company could improve visibility in a flat supply chain in an ever flattening world?

McDevitt and Van Hise (2002) proposed the atomic views of supply chains manifesting its vibrant characteristics due to people in their hearts who radiate their sphere of influence onto the business environment that is extremely difficult to model. Human interactions are basically interactions between different humans through their respective spheres of influences in personal, social and

working life where emotion also plays a very significant role (Fig.2). The uniqueness of human participants is what creates variety in human interactions which many a time is dominated by emotions that is very difficult to model and/or simulate.

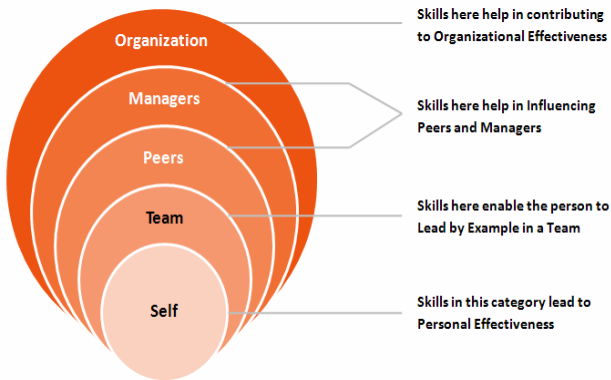


Fig. 2. (a) Human Sphere of Influence

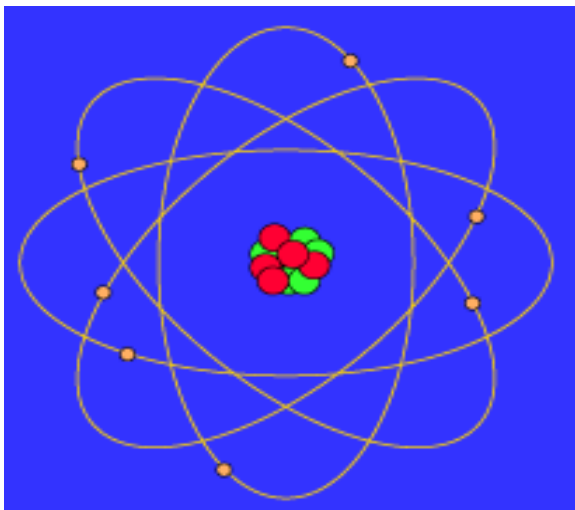


Fig. 2. (b) Bohr Atomic Model

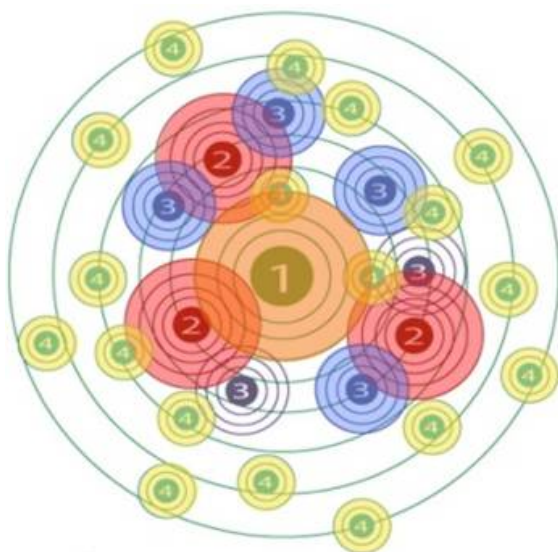


Fig. 2. (c) Interacting Human Spheres

Fig. 2. (a-c) Comparison of Atomic Views to human Sphere of Influence

Mendeleev’s periodic table is an extremely useful framework to classify, systematize, and compare different elements and their chemical behaviour. The periodic table contains only 118 elements as of today compared to 6.8 Billion world population. It is therefore impossible, if not absurd, to classify and/or group 6.8 Billion human emotions (similar to atomic number in periodic table). At the core of a flat supply chain a human network of networks orchestrates material, information, logistics & transportation, material handling, customer needs and transaction flows to ensure seamlessly integrated and synchronized operation.

The technological medium has accelerated individual abilities to reach more people than we ever could in the physical world. This new reach extends the promise of satisfaction through human relations which enriches human experiences of giving, sharing, learning, relating and re-enforcing or improving ones identity.

A business or enterprise is fundamentally a human network of ‘networked relationships’ in a socio-economic context where individual emotions and their uniquely different spheres of influences interact under the canopy of trust, negotiations, communication and contracts. In a flattened world specific identity of manufacturer, supplier, producer and service provider is blurred since driven by a human network of networks.

3. New Enterprise Models

According to Bernus (2001), a model is any construct, on paper, in the computer, or in any other medium, which shares some important properties with a real or contemplated system that is being modelled. He views all enterprises as a collaborative effort of many individuals that are in a constant flux of change. He also emphasizes the need for communication between people with different disciplinary background (cross-functional teams). McDavid (2005) views enterprises as human social system. He raises various architectural view points to augment enterprise as a social system that limits the successful application of technological prosthesis or design of the structure and relationships.

Based on a recent case study in Australia, China and India, four new models have been developed: People-Centric, Molecular, Globally Dispersed and Disaggregated Value Chain. All these four, apparently different but inherently similar, models have a vibrant architecture and system behaviour in its core that suits the emerging trends of the flat supply chain. They are discussed briefly as hereunder.

3.1 People-Centric Model

This new enterprise model (Chattopadhyay and Mo, 2010) has been designed for a typical Engineering, Procurement and Construction Management (EPCM) company but can be applied to any manufacturing or service oriented enterprise irrespective of their size. In essence the modelling methodology can be applied to

Small and Medium Enterprises as well as large corporations. Therefore it is generalized in that sense. An enterprise is perceived as living because of its people. It is driven by people and exists for customers who are also people - the end user or beneficiary of a product or service. Information flow and communication acts as a glue to hold people together having a common goal and purpose. Hence this part of the model is universally common to all enterprises.

People play the pivotal role in any organization and their presence pervades through all layers of the organization from shop floor to the board room as shown in the people-centric model Fig.3. People use their skills, knowledge (tacit and explicit) and resources as available to them (tangible and intangible) to produce individual outputs. In units of time, these outputs are products and/or services or parts thereof. This is true for all people in the enterprise irrespective of their position in the hierarchy. At the micro-level, the units of outputs are therefore the product of skills, resources and time.

Any enterprise has to have its own organization structure, strategy and customer. In fact a customer focused strategy drives the structure and restructuring of any organization today.

This justifies the need to include all functions, disciplines, resources and above all its people and their skills in the model. Information flow is vital to hold various elements in cohesion and acts as the glue to the structure of the organization.

This model has a number of layers or gates which are, for a typical EPCM company, engineering, procurement, construction, quality, risk and so on but except the 'feedback' (both formal and informal) layer which is common for all other layers and has been shown with an

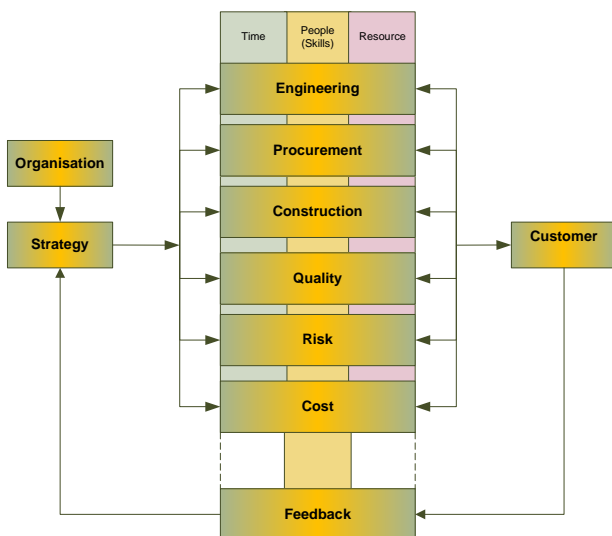


Fig. 3. People-Centric Model (Chattopadhyay and Mo, 2010)

extended dotted line. The layers and their numbers would be different according to the function, organization structure, its size and type (manufacturing or service), workflow and so on.

3.2 Molecular Model

Fundamentally an enterprise is created, designed, maintained, transformed and even decommissioned by its only living entity "people". The premises of an enterprise (say a building or a factory shed) devoid of people are mere concrete jungles, deserted and dead.

This model argues that people are the only unique, living, animate, and yet the ultimate building block of an enterprise like the way atoms are for matter (Chattopadhyay et al, 2010a). Some of the unique attributes of a human are:

- Capacity to identify, receive, store, analyze, transmit and interpret data/information. It can also transform received data into explicit and tacit knowledge and can innovate
- Enormous flexibility, agility, resilience, adaptability, and mobility
- Capable of performing at different energy levels (like different electron shells/orbits in an atom) depending on the nature and magnitude of the internal and external stimuli
- From the system point of view humans may be perceived as an independent, standalone, intelligent and effective information and communication system by themselves – resembling an enterprise.

People (say employees) transform raw material into finished products with the help of plant and machinery (R), their skills (S) and Information (I) as available on real-time. When visualized through the lens of atomic structure the scenario appears as if, at individual level, people with their brain as nucleus in an atom are using the resource and information available around them in orbits and then transforming the raw materials to finished goods by their skills. The finished goods (output) are then supplied to a customer to fulfill their needs. In this case a transaction may be viewed as completed when the output (P) satisfied a customer need (H) (Fig.4). Humans, as producer or customer, resemble similar structural features like atoms when visualized and modeled.

This 'give' and 'take' transaction is similar to 'donor' and 'acceptor' concept of electrovalent bonds in a chemical reaction. Similarly in a collaborative environment the concept of covalent bond may also be equally applied. In essence any human interaction is perceived as interaction between two or many individuals and their respective 'sphere of influence'. In essence any human interaction is perceived as interaction between two or many individuals and their respective 'sphere of influence'. Under this context revenue can therefore be interpreted as the cost of transference of P to H.

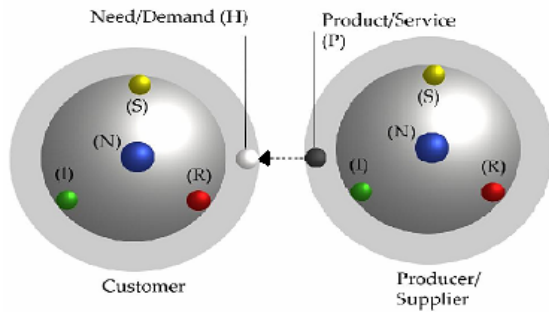


Fig. 4. (a) Demand Driven Delivery

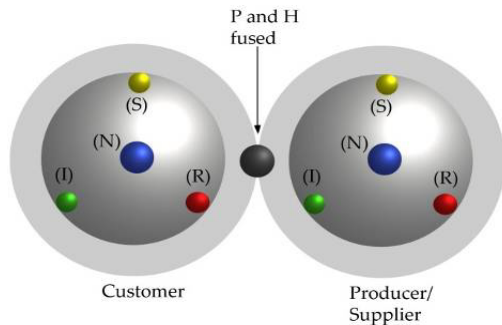


Fig. 4. (b) Infusion Demand/Supply

Fig. 4. Atomic View of Demand Driven Supply Chain Scenario (Chattopadhyay et al 2010a)

3.3 Globally Dispersed Model

This multi-manufacturing company virtual enterprise (MMCVE) model represents a holistic and simplistic approach for a business model for virtual manufacturing that embraces a human-centric and eco-friendly approach in line with the emerging global trend in manufacturing (Chattopadhyay et al, 2010b).

In order to combat today's complex business environment, large manufacturing firms are moving towards a globally dispersed but integrated business model. It has now become obvious that collaboration, partnerships and mergers create multi-company enterprises. Portals, Vortals, BI portals and B2B technology continue to create solutions based on specific software package-to-package paradigm. Under this option, protocols of knowledge consisting of interface and data definitions/standards present the core architecture enablers for the integration of enterprises. In a distributed manufacturing facility the need for creating a framework that would define the interface specifications for partner companies to operate in a globally dispersed business environment is fundamental. In this model the lead enterprise and other supply chain members/contractors are connected to the main interface bus. They can be hooked 'on' or 'off' by choice or need by the lead enterprise as shown in (Fig.5). Any number of partner companies can thus operate in a globally dispersed environment through the proposed framework on the dispersed production system.

A typical manufacturing system needs to be integrated with the business model of which sales and warehousing

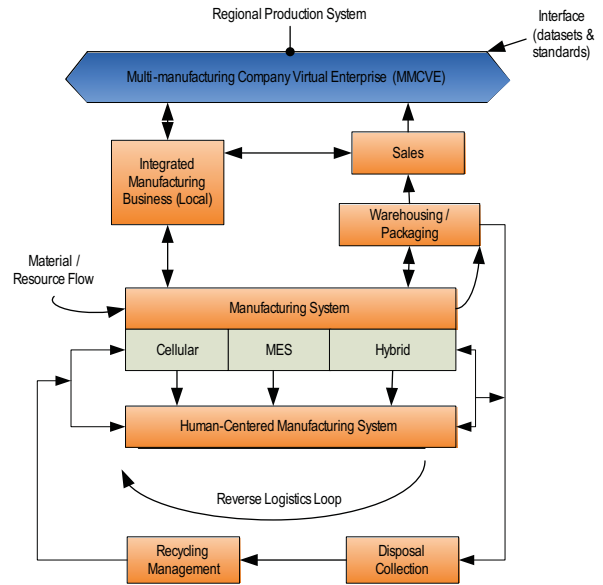


Fig. 5. Multi-manufacturing company virtual enterprise (MMCVE) model (Chattopadhyay et al 2010b)

etc are also typical functions. Material and information flow play a dominant role in the operational level of a typical manufacturing organization. A manufacturing business needs to be also conscious and active in the reuse of disposal from manufacturing waste etc, as appropriate, through recycling and reverse logistics. This is mostly done at the shop floor level.

This model proposes a typical regional production system connected through MMCVE. It also enumerates a manufacturing system in the shop floor that operates through an integrated and optimized combination of cellular, MES and/or hybrid of cellular & MES mode, as the need arises, in order to combat the variable-variety, variable-volume and manufacture-to-order situation or a combination thereof.

At the heart of the MMCVE is a human-centred framework that takes into consideration the wastage minimization and recycling and represents a typical outfit for distributed manufacturing.

3.4 Disaggregated Value Chain

In a disaggregated value chain structure the key value generating activities take place across various units or locations within and number of independent organizations acting as suppliers, distributors, producers within a network architecture or structure as the progress of value creation of the product or service moves towards its final exchange outcomes.

The disaggregated value chain (DVC) is perceived as a value adding collaborative partnership (VACP) amongst people who work closely together on trust to manage the flow of goods and services along the entire value adding chain.

Some of the advantages of DVC are:

- Minimization of organizational complexity and bureaucracy

- Ability of any individual within units or between a number of independent organizations in the chain to concentrate and specialize only on its core competence
- Flexibility and agility to change constituent entities according to particular customer needs

One of the important requirements of DVC is the need for high and sustained level of trust amongst individuals within a business unit and members of the VACP. Humans play a pivotal role in the disaggregated value chain. They use their knowledge, skills and resources that are available around them to produce individual outputs that have a tangible value in a realistic dollar driven world. These human traits cannot be valued in terms traditional and accepted business norms or cost mechanisms (Chattopadhyay et al, 2010c).

The diaggregated value chain is fundamentally a network of people comprising of employees, management, contractors, consultants, customers, entrepreneurs and so on. The human network of networks orchestrate effectiveness and efficiency of a flat supply chain. Therefore from the modelling point of view a flat supply chain may be viewed as a "Human Network of Networks"(Fig. 6).

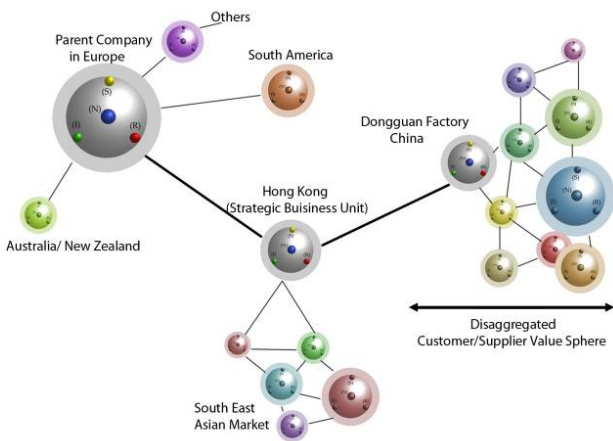


Fig. 6. (a) Disaggregated Value Chain

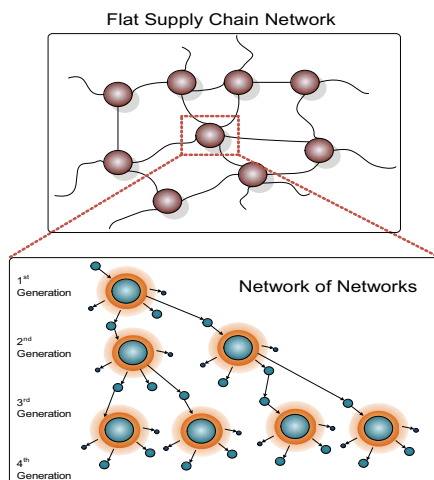


Fig. 6. (b) Flat Supply Chain Network

Fig. 6. Human Network of Networks

In a disaggregated value chain, therefore, the cash flow originating from a project and/or business opportunity or a major transaction gets dissipated through a human network of networks and cascades down the line to the individuals or groups who happen to be the ultimate beneficiary of the transaction.

4. Comparison of New Enterprise Models

Each of the foregoing models has special characteristics of their own and may fit different working scenarios under different circumstances. In order to apply these models effectively, one would therefore need to define their characteristics and weigh-up their pros and cons in terms of conditions and/or limitations if any. Using an inductive approach and utilising the qualitative findings of the various case studies recently conducted in Australia, China and India the importance and benefits of the four new models are briefly summarised in Table 1.

China has recently become the focus of international attention for various techno-economic-socio-political reasons. Hence, the adoption of an appropriate enterprise model that best fits the western culture as well as helps to build bridges between the two, at any instant, is of paramount importance especially for the Chinese manufacturers. Availability of the condition of use in Table 2 will serve the purpose of assisting the enterprise architect and manager in deciding on their subsequent choices and actions. The comparison table was drawn based on the features of four new models that were developed based on field studies conducted during 2008-09 in Australia, China and India with various enterprises ranging from Multi-National Enterprise (MNE's), SMEs (Small and Medium Enterprises), POE's (Personally Owned Enterprises) spanned in these countries. Primary Data were gathered during field studies and from various discussions that were held with the industry representatives in those countries. The detailed model development mechanisms were discussed in Chattopadhyay and Mo (2010) and Chattopadhyay et al (2010a, 2010b and 2010c). These industries encompass both manufacturing and service sectors in the areas of Oil & Gas, Electronics and Rubberised steel products for automotive, Process Valves manufacturing and so on under different operational settings.

In a human-driven society, economics and business world of the 21st century proper alignment to the values and culture of the West is almost mandatory for the Chinese manufacturers and this will continue to remain the top agenda in the years ahead for them. Experience gained during the field study also corroborates with this view and observes early signs of such efforts from the Chinese counterpart already. The Chinese manufacturers should arm themselves so that people and their individual sphere of influence play a significant role in orchestrating a flat supply chain which has a human network of networks in its core. Human integration through warmer relationship and trust is perhaps the

Model	Importance	Benefits	Condition of Use
1. People-Centric	Pivotal Role of People who are propelling force for any enterprise	Stimulated workforce not simply empowered workforce	This model is suitable mostly for Multi-National Enterprises (MNEs) with massive global operations supported by highly skilled trained workforce e.g. Energy, Gas & Oil, Mining, Mega-Projects.
2. Molecular	Business transaction is driven by human relationships and their sphere of Influence	Helps to analyse micro-architectural aspects towards enterprise engineering and integration efforts	This model is suitable for "holding" type of companies retaining core skills or business intelligence e.g. Trading companies, consulting etc.
3. Globally Dispersed	Human Network of Networks through cyberspace	Collaborative and shared approach to resources, talent and customer management through enhanced ICT support	This model is more suitable for OEM, OBM and ODM type of companies. OEM: Original Equipment Manufacturer OBM: Original Brand Manufacturer ODM: Original Design Manufacturers
4. Disaggregated Value Chain	Resembles atomic fission phenomena in value creation	Maximizing value creation through spirited approach to innovation, continuous improvement and change.	More suitable for complex networked organisations but not necessarily with intense high technology and requiring massive investment in IT

Table 1. Comparison of Four New Models

only way to pave the way to more glory and prosperity for China in a flattened world with more flattened supply chain.

Historically the Chinese culture and society values trust most. It has a closely knit and highly regimented business structure where human emotions are dormant and well controlled, if not masked. In the sparkling light of the information flow with lightning speed today the Chinese knowledge workers need to adopt and learn to enlarge their sphere of influences as has been shown in Fig.7.

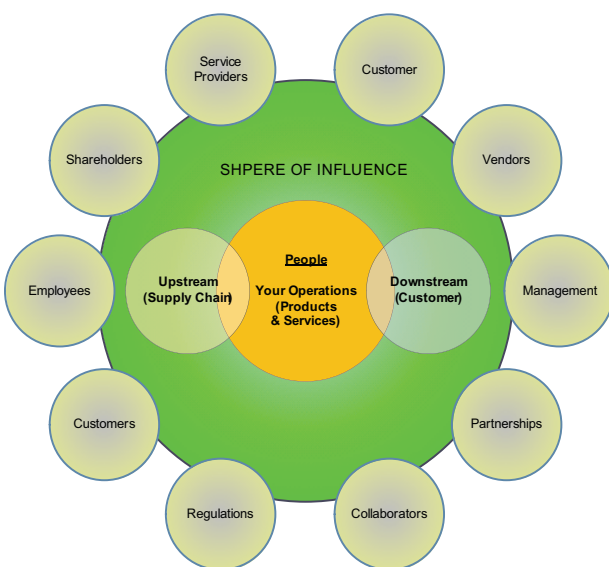


Fig. 7. Peoples sphere of influence

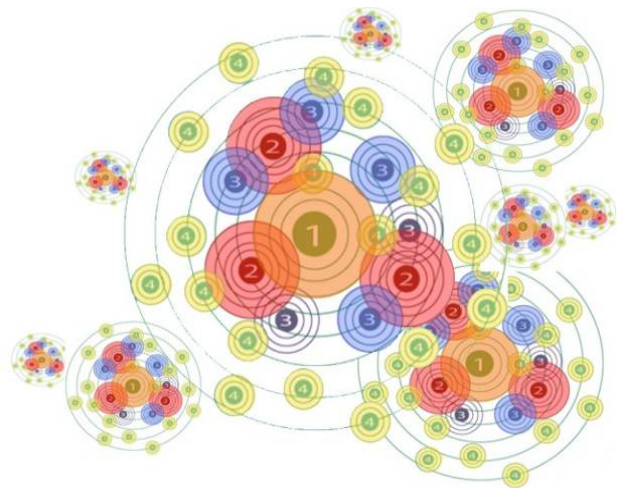


Fig. 8. People interaction with trust and emotion

The interaction of their trusts and emotions need to produce a continuous ripple into the flat global supply chain to convey a message of warmth and openness as shown in Fig. 8.

Thus all the four models are stimulated and energised by people at their very root and stem that produce variety of fruits with different shapes, sizes, textures and even sometimes in tastes but fundamentally they all belong to the same tree and the same species. The Chinese flat supply chain therefore needs a model that is unified and integrated and at the same time plucks the best features of all the four models.

5. Unified Model for the Flat Supply Chain

Unification means gluing or stitching things together. For example the parts of the unified product keep their previous identities but they are now joined together in some manner. Integration builds on unification but it is something more. An analogy resides in the difference between a mosaic and a tapestry. A mosaic unifies pieces; a tapestry interweaves threads. Mosaic is to unification as tapestry is to integration.

Therefore when the four enterprise models are unified their identities should not be lost but are now joined together in a manner such that their previous identities are kept. This fundamental requirement of unification necessitates clearly defined pathways to switch from one model to the other smoothly and seamlessly as and when required. One such commonly used method is to identify and establish pathways by "Mapping" (Noran, 2003) against the reference model or architecture of the enterprise.

This paper considers the People-Centric model as the Reference Model with the other three models i.e. Molecular, Globally Dispersed and the Disaggregated Value Chain mapped against this reference.

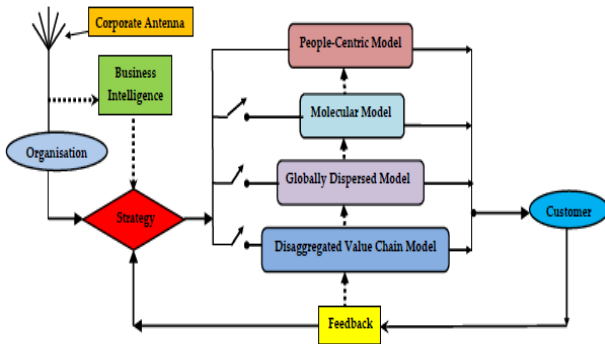


Fig. 9. Unified Model

5.1 Description of the Unified Model:

The unified model uses People-Centric Model as the reference model and provides an option to choose any or a combination from the rest three models through a number of switches. The fundamental EA of the unified model remains same as driven by strategy and facing the customer.

Since all four models have the commonality in terms of People Skills (S), Resource (R) and Information (I) at their core with varying layers depending on purpose and need the three models i.e. Molecular, Globally Dispersed and Disaggregated Value Chain can be mapped against the reference People-Centric Model as in Fig.9.

This paper offers a unified model with four such options. In this Unified Model one could chop and change, enhance, plug and play and/or switch "on" or "off" or "add-ons". The Unified Model is a customer focussed, strategy driven but flexible model that incorporates and embraces all the four models. This feature makes the Unified Model more agile, resilient and 'sense and respond' type in the flattened supply chains of the flat world. The unified model was tried out with Signotron (www.signotron.com) in India and Mackay (www.mackayrubber.com.au) in Australia and GEW Corporation, Hong Kong (www.gewcorp.com). The unified model, when applied, gives better flexibility to the respective enterprise architectures thus helping to "sense and respond" to customer needs. The model also helps to allocate synchronized resource and skill utilization and improves trust amongst employees. This helps to improve the efficiency of enterprise in terms of productivity gains and larger market share.

5.2 Why China needs new unified supply chain model

In the 21st Century any supply chain integration strategy detached from e-Commerce and B2B technology will not

succeed in any country and China is no exception. China's Digital Signature Law, which became officially effective April 1, 2005, is one of the major milestones in the development of e-commerce in China.

Today's enterprises in China manifest many aberrations in terms of their structures and models. Currently in China a very diverse range of enterprises coexist starting from State Owned Enterprises (SOE's), Privately Owned Entrepreneurs (POE's), Joint Ventures to Multinational Enterprises (MNE's) and so on. Frequent and sudden change in ownership is also a transient but regular phenomenon if not a problem. The Chinese Government is starting to play a more supportive role towards enterprises. This can be seen in possible funding or support for strategic projects via the National Development & Reform Commission (like setting up of public platforms for supply chain integration, especially with SMEs). However, it should be noted that the government's influence will mostly stay in the top management level of the enterprises. Knowledge and skill at the operational level are still relatively insufficient to deliver successful Supply Chain Integration projects. In the US, most if not all supply chain solutions focus on realizing Return on Investment (ROI) to the buyers, or original equipment manufacturers (OEMs), through driving cost savings from the supply chain. If MNEs try to implement these solutions in China, they will very soon realize that there are more non-monetary factors like product quality, transportation cost and after-sales services that they must consider besides pure cost comparisons. When these factors are taken into consideration, there are really too few instead of too many suppliers and therefore encouraging online competition are not necessarily effective. The Chinese counterparts, chasing sourcing and production cost savings, are more interested in deploying solutions to generate more sales opportunities, especially in the international market (Tradelink-ebiz, 2006).

The sell-side solutions are in much greater demand in China than the buy-side solutions that are more familiar to overseas MNEs. Overseas supply chain integration solutions don't necessarily work in China due to various contradicting business interests.

The Chinese manufacturers with diverse heterogeneous organisation structures coupled with the already overheated economy as a direct result of rampant investment explosion from the West are likely to become unsustainable if proper information architecture and its management and control are not in place right now. This justifies the need for the Chinese manufacturers to explore and use new models for their supply chain that would give them the choice and option of playing the right card at the right time in the world stage. When the Unified Model is viewed through the atomic lens it would then appear as in Fig.10.

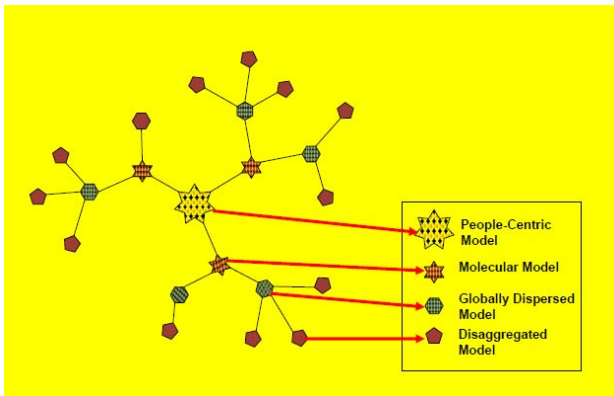


Fig. 10. Atomic Views of the Flat Supply Chains in China

6. Conclusion

This paper has first explained the typicality of a flat supply chain and then enumerated micro-views of the flat supply chain in the light of atomic views. It then further explains its dynamic and vibrant architecture and system behaviour that stems out from people the heart of the architecture.

People and their sphere of influence play a critical role to influence emotion, group dynamics and reaction to other humans. Atomic views of flat supply chain can throw some light on how trust is built over a period of time through human networking of relationships. Finally four new enterprise models are briefly discussed to explore whether these emerging models could possibly help to develop atomic views of the flat supply chains. A comparison of these models, that were developed and validated with the help of recently conducted case studies in Australia, China and India during 2008 and 2009, is also discussed to show their respective importance and benefits.

This paper concludes with the suggestions, in the light of the atomic views of the flat supply chains as developed under the backdrop of the four newly emerging models viz. People-centric, Molecular, Globally dispersed and Disaggregated Value Chain Models, that the Chinese manufacturers might be better off with the People-centric and/or Molecular models for their domestic market while a need based combination with the Globally Dispersed Model as a lead model is more suitable for the export and global supply chain market.

7. Acknowledgement

The author thankfully acknowledges the kind support and constant encouragement from his Principal Research Supervisor Prof. John P.T. Mo, Discipline Head, Materials and Manufacturing Engineering, RMIT University, Australia.

8. References

- Bernus, P, Nemes, L and Schmidt, G (2003): Handbook of enterprise architecture, in *International Handbook on information system* (ISBN 3-540-00343-6)
- Bernus, P. (2001). Some thoughts on enterprise modelling. *Production Planning & Control*, 12(2):110 – 118
- Chattopadhyay, S. and Mo, J.P.T., (2010). Modelling a Global EPCM (Engineering, Procurement and Construction Management) Enterprise. *International Journal of Engineering Business Management*, Vol. 2, No. 1 (2010), pp. 001-008.
- Chattopadhyay, S., Chan, Danny S.K. and Mo, John P.T., (2010a). Analysis of Disaggregated Corporations of the 21st Century using Molecular Structure, *International Journal of Management* (submitted, under review)
- Chattopadhyay, S., Chan, Danny S.K. and Mo, John P.T., (2010b). Business Model for Virtual Manufacturing – A human-centred and eco- friendly approach”, *The International Journal of Enterprise Network Management* (accepted, to appear)
- Chattopadhyay, S., Chan, Danny S.K. and Mo, John P.T., (2010c). Modelling the disaggregated value chain – the new trend in China. *22nd Annual Conference of the Association for Chinese Economic Studies Australia*. La Trobe University, Australia 15-17 July. Accepted Conference Paper.
- Friedman, T.L., (2005). *The World Is Flat: A Brief A History of the Twenty-First Century*. Farrar, Straus and Giroux. ISBN: 0374292884
- Fung, V.K., Fung, W.K. and Wind, Y. (2007). *Competing in a Flat World: Building Enterprises for a Borderless World*. Wharton School Publishing. ISBN-10: 0-13-IFEAD Report of the Measurement (2003-05). Trends in Enterprise Architecture. How the organizations are progressing. Institute for Enterprise Architecture Developments.
- Mc Devitt, R., and Van Hise, J., (2002). Influences in ethical dilemmas of increasing intensity. *Journal of Business Ethics*, Oct2002 Part 2, Vol. 40 Issue 3, p261-274, 14p,
- McDavid, D. (2005). Systems Engineering for the Living Enterprise. *Proceedings of the 18th International Conference on Systems Engineering, IEEE Computer Society. (ISCEng'05)*. 16-18 August, Las Vegas, USA, ISBN: 0-7695-2359-5
- Saenz, O. A. and Chin-Sheng, C., (2004): Second LACCEI International Latin American and Caribbean Conference for Engineering and Technology (LACCEI'2004) “Challenges and Opportunities for Engineering Education, Research and Development” 2-4 June 2004, Miami, Florida, USA

Van Alstyne, M. (1997). The State of Network Organization: A Survey in Three Frameworks. *Journal of Organizational Computing* 7(3) pp 88-151.

Zeng, M. and Williamson, P. (2007). *Dragons at Your Door*. How Chinese Cost Innovation is disrupting

Global Competition. Harvard School Press. ISBN: 9781422102084.