PLANNING SKILLS FOR SOLAR SUPPLY CHAIN MANAGEMENT

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ABSTRACT

Solar supply chain in Indian context has a number of uncertainties due to demand/supply fluctuations and unclear visibility of state policy. Competition from global suppliers adds to this uncertainty for domestic ones. Supply chain planners are facing challenges on account of such uncertainties. The role of planners need an additional skill set over and above generic supply chain planning, to optimize interest of all stakeholders of supply chain. The paper tries to bring out additional skills and competencies required in solar supply chain planning. Paper include a brief discussion as to why a generic supply chain planning skills are not sufficient for optimizing solar supply chain in Indian context.

Keywords*: Solar planning skills, Solar Supply Chain, special planning skills.*

Introduction:

Solar industry is passing through a number of uncertainties of demand and supplies globally. Such a market where uncertainty of demand exists creates a challenge to a planning role. A generic planning role as described in an FMCG industry where demand and supplies are uncertain within a predictable band of variation, solar supply chain demand and supplies variation is highly uncertain. Planning for an FMCG, is a well-established model, forming a base for other further complex supply chain planning. Additional width variables (Shukla and Mali, 2015) creating complexities to planning for different products and customer segments is under evolution along with industry sector.

In the research paper it is hypothesised that the generic planning skills and competencies alone are not sufficient to build a strong supply chain planning for solar industry. The research paper brings out additional skills set expected from solar industry planners to cover up further complexities.

Our basic alternate hypothesis in this research paper is "HA - Role of supply chain planners needs to be strengthened with specialized skill mapping for effectiveness of solar energy companies". Our various interviews with solar organizations tries to understand what skills set can strengthen this role across the industry.

Body of Research Paper:
Literature Review:

The aspects of supply chain planning skills include collaboration, coordination, integration, requirements as laid down by planning literature. These stated skills are very generic and need customization specific to industry sector. The literature mentioned here tries to substantiate some of such planning skill requirements. Further paper has developed specific sets of skills and competencies for solar industry.

In recent times the span of collaboration and integration goes beyond normal commercial relationships which involve organizations and enterprises working together (Matopoulos, Vlachopoulou; Manthou; Manos, 2007) [7]. (Anderson and Lee, 1999, 2001) [1] (McCarthy and Golicic, 2002) [8]. Elaborate further on the importance of supply chain collaboration from micro and macro perspectives separately in the body of supply chain literature. Elements making integration potentially underperforming deal with knowledge ambiguity (e.g. Levin and Cross, 2004; Simonin, 2004; Szulanski, 2004) [6] [10] [11]: tacitness, specificity and complexity of the underlying

knowledge to be transferred from function to function have been observed as constituting elements of knowledge ambiguity, decreasing the attitude of functions to collaborate (e.g., Zhao and Arnand, 2009) [12], but also making integration-oriented policies either ineffective or inefficient (e.g., De Luca and Atuahene-Gima, 2007) [3].

Companies are dedicating more resources understanding and fulfilling unique need of the important customers indicates the importance of resources. This cover need of resources, not their competencies, a sector specific competencies and skill set can prove to be a next research in this direction. This has further been demonstrated that the majority of firms do not yet have the alliance skills needed to build a cohesive supply chain. Another argument that leading supply chain companies recognizes the need to do everything they can to help build the skills of the entire supply chain team. They also are focusing on increasing supply chain capability dramatically (Fowett, Magnan, Magnan, 2005) [4]. Uniqueness of solar supply chain planning skills is mapped under this study.

As a result, decision-making is usually delegated and decentralized in functionally specialized organizations, to make most effective use of specialist knowledge and expertise in the various intra-organizational functions (Herzberg 1974)[5].. An interview insight seeks more clarity for solar industry and decision delegation on supply chain planning.

Cross functional team members' skills: investigation was primarily concerned with teams' processes; some issues related to human resources were not addressed. Future research may investigate about the necessities of the teams in terms of members' skills, specifically in processes related to demand and supply management, in order to address questions like: what are the necessary skills and knowledge? Which individual skills are adequate? Richer qualitative data can be collected through, in depth interviews. (Pimenta, Silva, Tate, 2014) [9].

A fresh look for the aspects of planning decision and skill required is to be considered with regards to dynamically adjusting the information which can help in planning based on aggregate status information, the impact is even less clear (De Kok, 2002) [2].

Research Methodology:

The research tries to bring up a skills and competencies required for "solar project planning" to achieve an optimum supply chain results. Three sets of respondents are interviewed to understand such skills and competencies requirements in solar industry.

Three business segments respondents are - solar manufacturing, solar EPC contract or development of solar projects and solar products. The three different solar segments have a varied dynamics and thus research is intended to put a balanced focus on all the three business segments.

Before carrying out detailed interview, a small case study from one solar company is used to put forward research question and hypothesis. The case study company chosen in such a way that it should represent all three business segments to ensure relevant supply chain research problem.

During case study a basic understanding of supply chain planning skills and competencies requirement is understood to frame appropriate questionnaire to further validate through more in depth interviews.

Scope of paper is to study area of Bangalore region wherein there are approximately five major solar players- Tata Power Solar, EMVEE solar, HHV Solar and Kotak Urja. In addition about 8 small solar product distributors and whole sale retailers are considered for samplings who are distributing solar products. Some major players from across India were also included to be interviewed from out of Bangalore region, significantly contributing to solar industry in India. These players considered for sampling include Lanco Solar, Indo-solar, Vikram Solar, Moser Baer and some other smaller players.

Research is to find out planning skills and competencies from the solar industry for a period between years 2010 to 2015, under given market conditions. Limited period of research specifies certain prevalence of specific state policy, market conditions and practice adopted, which were drivers of required skills and competencies.

The study is conducted based on 25 semi structured interviews of respondents from the companies listed above. An interview questionnaire is prepared based on case study. This interview questionnaire is designed to capture key skill themes emerging across the industry based on the skills captured during case study. The objective is to substantiate the hypothesis based on larger responses. Each of the interview questions is posed in front of interviewer with the best of language he can understand. A basic premise of the topic is explained to respondents, in the form of sequence of events happened in solar industry between year 2010-15, to bring out relevant skill requirements from the interviews. Interview questionnaire was sent in advance to respondents to go through as a pre-read, to minimize the discussion time and bring out more relevant voices and images on questions.

Analysis & Findings:

The paper compares the skills and competencies of generic supply chain planners. The closest comparison can be drawn based on an FMCG planner who operate based on well-established demand and supply uncertainty trends. A secondary research brings out following most significant group of skill sets as observed in various literatures.

a) Statistical Forecasting.
b) Stock planning based on demand, seasonality and any special demand factors.

c) Tracking movement patterns of stock keeping units (SKUs).
d) Keep track of inventory and customer fulfilment.
e) Tracking stock outs across the channel.

While asking a question from respondents about skill sets required for a planner in solar industry, we received an enlarged planning role for solar projects. Role of supply chain planners and project planners has major overlap in solar industry. Material planning and project planning role is hard to distinguish for the industry under study.

Solar planners were supposed to have skills of anticipating solar market, which is largely governed by central and state government influences. Planners are considered as challenging entities, in event of optimistic demand quantity forecasted by sales team. In the event, a solar supply chain planner is not able to rationalize demand, there is high probability of large unutilized stock accumulation.

Solar supply chain planner interfaces with multiple planners in solar developer and manufacturer's organization on a day to day basis after award of solar projects. An end to end understanding of solar project, from order winning to project commissioning, including various statutory approval, quality assessments and expectation of documents is also supposed to be planned by solar planner.

Solar planner skill sets, are inclined towards a virtual "project team leader" along with a skill of planning. In a solar company multiple stakeholders has a varied view about the demand. A realistic view consistent with the solar market is difficult to achieve without a rational orientation. As a team leader, planner is expected to drive a demand view point consistent across all stakeholders in a solar firm. Solar industry respondent were highly dependent on planner's view, as a most realistic one, as against view point of rest of stakeholders. Stakeholders, as a part of the solar organization seems to have a limited or biased view depending on their interest derived from their function. For example, sales view was highly optimistic on purchasing material and stocking, whereas finance department and operations view is most pessimistic to avoid stocking as much as possible. A limited or biased view on supply chain planning is an optimum planning view for liquidity crunched solar industry.

Planner in solar industry are expected to be able to plan stocks based on global capacity, price and availability rather than just with a view of domestic suppliers (Shukla and Mali, 2015). Such a planning decision is helpful to leverage on short term and long term cost investment for overall solar projects. Based on images and requirements, expressed by respondent, a solar company planner should have an additional set of skills and competencies. These skills and competencies are grouped as below

a) Understanding and forecasting of central and state government solar regulatory environment.
b) Government tendering processes and its length to decide an order winner.
c) Understanding of specifications of solar products to have an efficient expediting.
d) Understanding on alternate usage of material based on best match of specifications, in case of an existing order cancellation or alterations.
e) Special state taxation structures on solar products.
f) Ability to connect to top most management for wider planning inputs.
g) An understanding of solar order to cash cycle, to manage healthy material supplies to fulfil on time customer demand and optimizing cost of fulfilment
h) Capability of judgment on probability of winning an order, in addition to view represented by sales staff.
i) Knowledge on solar project quality expectations and certifications requirement, as laid by state for solar projects and products.
j) Knowledge on financing schemes and their impact on solar projects and product demand.
k) A hang on project documentation with government agencies and customers.

The above list overweighs the general planner's skill requirements, as expressed above. Our interviews with players revealed that the additional skills and competencies requirements in solar supply chain are much beyond a conventional one. It needs to be further strengthened with new skills, considering some of them mentioned above. At lower hierarchical level in a solar organization, ready planners with this required skills sets had a weak match without a senior managers representing higher hierarchical level. Interview respondents agreed that to build these skill sets at lower hierarchical level of planners, it required special focused development of skills.

Discussion:

Our interviews revealed that planning process in solar firms are additionally being handled by senior officers, including CEOs and MDs. This is because of gap in skill set required and available with existing planners. Senior officers of a solar firm, had a solar clout, networked with government, solar association and manufacturers. Senior officer are helping planners to have a better anticipation of solar demand being affected by multiple regulatory and market factors. In addition, senior management team keeps a close watch on leading indicators of solar industry, to build back-end supplies, either by procuring, manufacturing or sub-contracting.

Supply Chain infrastructure expansion decision for distribution, warehousing and logistics goes to only highest level for approval because of gaps in skill levels of evaluation, by supply chain planners. Respondents feel that finance controlling function is

influential in setting priority for order fulfilment, generally based on faster expected cash inflow. In an ideal environment such prioritization should be handled by planners, provided they are equipped with necessary skills and competencies. Planners are expected to be a cash manager; they should have an understanding of liquidity situation to ensure organization wide optimum. A right planner's skills should include understanding on state policy, taxation, and project commercials. Planner must know anticipated cash collection from customers and falling payment due dates to suppliers. They should be able to prioritize the right sequence for dispatch of material to match correct procurement sequence. To have an effective control, supply chain surplus management should takes place at a planner level rather than at finance department level. Planners should be a traffic controller, coordinating with both finance and operation functions.

In solar product planning, planner should know various financing and subsidy schemes runs by central and state agencies. Solar planners are also expected to know details of various tendering process run by state and central government. In large scale orders under government tender program, planer starts planning from the stage of tendering itself. A planner need to be aware about state policies expected to be rolled out by ministry of commerce related to excise duty structures on various solar procurement items, to see if demand is shifting from one source to another (specially domestic source to abroad or vice versa). This can be due to levying of new duties or obsolescence of old ones.

Planners are expected to have a visibility of an alternate use of the material, in case ordered material is not utilized for existing order. By such an expedition of alternate usage, risk of excess stock and poor liquidity can be avoided. Alternate utility for such material may be sought in event of order lost or quantities in an order are reduced. At times, alternate use of material may not be possible. Planner must possess strategic skills to seek possibility of liquidation of material to release cash, e.g. selling planned material to a solar player who may have similar order from a similar tender or in a different requirement.

Planner should be able to judge peak and trough in demand, during the planning horizon, to adjust the forecast. Planners have to remain connected to last mile in retail channel to judge entry of an alternate product in the market, especially from China, to evaluate impact on existing product demand.

In case of manufacturing of solar cells or module planning, some of critical engineering specifications like cell and module energy conversion efficiency is expected to be understood by planners. During manufacturing, cell efficiency has large variation due to equipments, skill and process parameters. Any miss in the efficiency performance against specification, can lead to non-acceptance of modules by customers and leads to inventory pile up. A manufacturing planner needs to keep watch on cell and module efficiency in manufacturing to match customer expectations. A large volume of module with low efficiency production can lower down production volume and delay in fulfilling customer order as planned. Planners are also expected to simultaneously plan customers whose specification is of lower efficiency, to liquidate normal by-products which is not meeting higher efficiency requirements of customers. The planners are expected to possess basic knowledge on solar module engineering to suggest design department, to include modules in ongoing projects. This helps to seek possibility of inventory liquidation to maximize benefits to their firm.

Planners can play a major role in helping procurement team, by seeking possibilities of placing bulk orders as far as possible, to take advantage of economies of scale. Planners can have a visibility for a little longer term, since some of raw material is generic in nature and can be planned in advance to procure an "economic order quantity". With a close watch, planners can get help in consuming any sort of cells and modules production lying in existing stock.

Planners are expected to be able to create an environment of coordination, with internal as well as external stakeholders. They are expected to convince finance, design engineering and related stakeholders about the importance of planner's decisions to maximize surplus to company. Planners are expected to be skilled to connect seamlessly to top management, to assess factors in larger business environment to decide how much and which project need to be executed in the light of new regulations and support. Planner should be able to relate business leader's perspective as to why a decision is being made. They are responsible for achieving organization level optima, not at stakeholders and department level narrow optimization.

Planner are also expected to have an understanding of domestic and international solar project sales, to judge probability of size of orders and anticipated time of delivery. Sales staff tends to put extra optimistic view of demand to give priority to a delivery which may not be due. Planning team has to pass through high stress, in an attempt by sales team to create maximum upward volume distortion, since they are incentivized on fulfilling sales volume at their earliest. Planners should also be aware about international certification to meet the conditions of various orders requirement for exports. Even if product is ready, but if appropriate certifications are not acquired, it can causes problem of cash lock in inventory. Planners can trigger fulfilling such requirements well ahead of time.

The above discussion brings out the fact that a planning professional exposed to solar state policies

and project execution experience would be an idle match for solar industry.

Conclusion:

Solar supply chain planner's skills are wider than a material planner. This role of material planner is closer to project planner. Such planners should have following additional skills and competencies in addition to supply chain planning

1. Skills of anticipating solar market, which is largely governed by central and state government influences
2. An end to end understanding of solar project, from order winning to project commissioning, including various statutory approval, quality assessments and expectation of documents
3. Creating a most realistic demand view as against other optimistic and pessimistic stakeholders.
4. Collaboration and seamless coordination with top management to rationalize planning view optimally.

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