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Critical analysis of some components of P^3 * System

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Abstract
It is theoretically established and fortified by experience that P^3 system* is the maximal sound system that can suitably be adopted (with a few changes related to different cases like enhancing production capacity in the case of emergency supply of life-saving medicines etc.) by pharmaceutical companies. The designers**of the system have, by their experience, envisaged each important aspect of the system and have checked for its production efficiency. In this paper we have planned to critically review important phases and derived mathematical results that help decision making at various stages of the system.

Keywords: P^3 system, sales strategy, planning, production

1. Introduction
There are many important aspects to be covered under the titled area and in this note we have reviewed the system and have analyzed different areas which, we think should be be refined to combat with small issues. Some of the issues along with their root questions and probable solutions have been dealt in this articles while other equally important are expected, along with probable solutions, to appear in our forth coming extensive work.

1.1 Origin of root features
On receiving feedback*on implementing of P^3 system from different corporations we thought of some organized strategies to analyse the leading features. A sequence of overwhelming results was necessary to frame in an organized mode. Some of the major decision making critical issues which are directly concerned with P^3 system proved a guiding and vital force to enhance the fundamental principles. This has remained a motivating factor to shape our findings in words.
[* Results shown in Annexure- A]
Before we begin to discuss the different aspects of feasibility and critically review them fixing the complexity, if found any, it is justifiable to give glimpses of the P^3 system.
As mentioned above we work on our formulated and fully equipped P^3 system; a system having three major components-Planning, Production, and Procurement. A narrow beam of insight will immediately reflect that it is an inter-woven one, in a way that each one of the components, though each component having many sub- sections, cannot stand alone. The prime objective is to establish a loop so that the estimated managerial planning to purchase and stock raw material for the necessary amount of production, ready to push finished strips or bottles of finished goods, and total sales and distribution plans till the product reaches end customers must be well organized in an efficient way that shortages-out of stock- cases hardly ever occurs either with the manufacturer or with the distributor or with the buyer at any stage/stages during a particular production run.
The safeguard against the presumed shortages are the three types of stocks-(1) Safety Stock, (2) Emergency Stock and (3) Lightening Stock preserved and administered, in the corresponding order, by the buyer, distributor, and the manufacturer.

1.2 Important features: The important features we found during our analysed study are discussed as follows:
(a) That the buyer does not receive the exact amount what he has ordered for instead he gets the goods by critically designed and periodically updated statistical calculation formulated in accordance to past sales figure by the team of statisticians appointed and executing at manufacturer's end. The amount that each buyer receives against his order is known as 'Normalized Demand'. This amount fluctuates with each order that the buyer raises.

(b) Along with the 'normalized demand' in the range 8% to 15% additional amount is also sent to the buyer; this is known as 'safety stock'. Buyers are instructed to start its consumption only about the time slot when the normalized amount is about to finish. [In fact what the buyer receives is a total that equals Normalized demand + maximum 15% more than the normalized demand.
The system considers this (max) 15% as a safety stock.
Also as a policy matter the buyers are given a fair discount [about 10%] for stocking this safety stock once they receive the normalized consignment.
As a virtue of real time tracking system the distributor and the manufacturer both become aware of the diminishing status of the existing stock lying with perspective buyer. This is the right period when the vendor instructs the distributors to manage respective amount of stock, called emergency stock, and to rush the same to the buyers only on receiving instructions from the buyers.
(c) Looking and analysing the current demand pattern of the buyer, the *time slot* that company needs get equipped to begin production and dispatch of new lot of the next batch, the company preserves a statistically estimated additional stock for each of its buyers; this is called 'lightening stock'. The authority is liable to send the same stock directly to the buyer keeping the distributors informed about the direct dispatch.
(d) In order to remain well aware of the latest status of the market situations and many related factors associated with market trends and movements, top management of the company remains highly active collecting numerous data from the appointed team of skilled and technical persons. In some cases it is advisable to assign such work to private agencies instead of incurring the expense of staff working under a data analyst.
These are some distinct and salient features of the P^3 system.

2. Planning

One of the most important components of the system is 'Planning'. It is a master factor that is, to some extent, partially associated with the two fundamental components and many additional components. Major decisions regarding production and purchase are initiated and reviewed by the team members of this department. The team members, based on past records and on study of market trends frame policy matters for the next schedule.
We have planning for the following aspects in Pharma business. We shall discuss some major aspects and important features of each one of them.

2.1 Planning for procurement

It is all that the strategists of the top line management need only one criteria to be taken care of is that the production, without compromising with quality, meet market requirements which in turn depends on the production capacity in a given time slot. Production capacity relies on continuous supply of necessary ingredients which in turn depends on timely, sufficiently enough supply of raw material without lead-time.
Feasible solutions of two major issues (1) When to procure and (2) How much to procure are capable enough to respond to any sub questions that are likely to arise pertaining to these issues. There are many points to be studied before one can answer these two questions and implement their solution in real actions.
A detailed study of robust market in which all kinds of raw materials are sold in free market, or on licensed quota, as per government norms, where in the purchase from the former generally being on higher rate and the one from latter option is on fixed rate. It is at this point quite easy to understand that a seasoned vendor balances both options for optimal average rate. The solution that fixes the first question when to order lies in comparative price study of national and multinational markets and market trends that fluctuates over a period of time.
The tentative solution to the next question how much to order lies in finding forecast of expected sale and corresponding amount of raw material to be purchased along with availability of necessary fund and payment terms of the company. On the top of these two points quality approval from the vendor's point of view and an agreement bond of maintenance of uniform and specified quality and timely supply assurance must be well agreed and signed by both the parties is the first legal criteria to be observed to safeguard mutual interests.

2.2 Planning for Production

For any proposed production plan we need fixing these two fundamental problems; these are:

(1) When to produce and
(2) How much to produce.

One cannot start production when 'no stock' point is about to confront us with all its associated consequences. It is the reproduction level either in terms of recommended time slot or in terms of the existing stock level should prevail to be the decision making criteria for the next lot size production.
We derive an empirical result which will help determine production criteria.

2.3 Decision making Criteria

Assumptions: We have certain assumptions based on which the results are derived.
(1) All the buyers and distributors have adopted, in principle**,** P^3 system and follow accordingly.

(a) Estimation of production time

***** Let Q stand for the total production size at the end of a complete production run. Let there be, during a cycle, n_1 the number of buyers and n_2 number of distributors; These number both n_1 and n_2 remain constant during production run. Also $n_1 > n_2$ Each one (say i^{th}) buyer receives the first lot of normalized demand units (q_i) along with safety stock (s_i) $\forall\ i = 1\ to\ n_1$
* Each distributor, say j^{th} one receives a lot, known as emergency lot (E_j) $\forall\ j = 1\ to\ n_2$

* Total dispatch in the first transaction = $\sum_{i=1}^{i=n_1}(q_i + s_i) + \sum_{j=1}^{j=n_2} E_j = Q_1 + Q_2$ where $Q_1 > Q_2$ (1)

[The first part shows total supply to the buyers and the second one to the distributors.]

* Let average demand per day for each buyer = $d_i \forall\ i = 1\ to\ n_1$ (2)

*Total demand per day = $\sum_{i=1}^{i=n_1} d_i$ (3)
* Consumption time = $(\sum_{i=1}^{i=n_1}(q_i + s_i))/ \sum_{i=1}^{i=n_1} d_i + (\sum_{j=1}^{j=n_2} E_j) / \sum_{i=1}^{i=n_1} d_i$

$= Q_1 / \sum_{i=1}^{i=n_1} d_i + Q_2 / \sum_{i=1}^{i=n_1} d_i$ (4)
$= t_1 + t_2$ where $t_1 > t_2$

[The first part shows the estimated time for the buyers to consume the total of normalized stock plus the safety stock at his average consumption rate. The second part shows the estimated time to consume the emergency stock.]

* Let Q_3 be the total amount of lightening stock at vendor's end. [Each buyer, on an average receives Q_3 / n_1]. Average time till the lightening stock lasts with a buyer = $(Q_3 / n_1)/ d_i$

* At the end the vendor has $Q_4 = Q - (Q_1 + Q_2 + Q_3)$ stock leftover at vendor's end.

* The vendor can proportionately supply this amount to each buyer. Each buyer receives Q_4 /n_1 units.[This is the stock forwarded which is over and above the lightening stock and it is considered as a second tier lightening stock which serves as a second stage safeguard against shortages. This type of situation may arise in rare cases where some buyers face a sudden rise in demand in some optional cases.
Average time this interim stock lasts = $(Q_4 /n_1)/ d_i$ for all i from 1 to n_1 (5)

* Let T_1 be the production time to produce the targeted production Q and T_2 be the time required for packing and transit time (lead time*)to buyers' end. Estimated time that the successive production lot can reach the buyers.

* From the last two results we can decide that when the average time till the interim stock/ second tier lightening stock lasts with buyers nearly equals the estimated production, packing, and transit time should be the time planned by the directive authorities.

i.e $(Q_4 /n_1)/ d_i \approx T_1 + T_2$ (6)

[Lead times not in terms of technical sense as the buyers are being taken care of by the supplier who, in turn, is worried about perusal of ideology of P^3 system.]

3. Planning for Sales Strategies
This stage is a critical stage. It has a self-generated loop and each component of the loop requires corrective measures depending on fluctuating market situation. Such situations are volatile and liable to lead to vulnerability of the set-up. It needs practical and prompt approaches in decision making.

3.1 The company appoints a team of experienced persons who are well versed in most of the policy matters of the company and assigns them rights to decision making up to a certain limit. They, to some extent work on the indicated lines as follows.

3.2 Study past records, decisions taken by authorities in critical conditions, impacts on sales volume, customers' reviews and feed-back. Study of parallel products-quality wise, price wise, distribution wise, and make comparative study in all possible aspects.
Comparative Study of advertisement policies using different medias of different companies and their widely accepted and popular brands sales promotion policies adopted by different companies on different time-slots etc. These are the important points which prove guiding mile-stones and desirable to be studied before framing the marketing policies.

3.3 The members of the team design marketing policy focusing on these seven points.
Regarding the product: (1) Quality Assurance (2) Distribution Management (3) IT Management/ ERP (4) Shelf Life (Longer time span between manufacturing date and expiration date)

Regarding Marketing Set-up: (5) Easy availability in open market (6) 'No shortages' in any case (7) Affordable and comparative price structure

Regarding Customer Care: (7) easy access for customers and positive attitude towards fixing customers' problems if there arises any (Customer relationship)

3.4 In addition to these following points play important role for sales promotion:
(a) Schemes for bulk purchase [Price break / discount on bulk purchase]
(b) Professional but liberal payment terms for the distributors and buyers (Liquidity and funding)
(c) Customers review and feedback only on keeping buyer and distributor in the loop (Customer co-ordination)

4. A word before we wind up
These are the main points required to tackle very carefully; if most of the above mentioned points are taken into consideration in laying down script of marketing management and train marketing staff then there are comparatively better chances to go highly successful over a shorter period of time. Timely up gradation in product and updating the strategies are the two strong drives in the business.

4.1 Planning for inventory management
Like the important points discussed above, one of the most important points is planning for inventory management. It is the most important one which is responsible to run the business smoothly or else all policies and planning will remain on paper. As in above mentioned cases are, here also we face two fundamental questions; they are as follows.
(1) When to stock and
(2) How much to stock

The answer to the first one lies in determining the proper time during or just before completion of the production process. But it is highly necessary to plan the amount for the stock that is estimated for inventory management. This is known as 'plan before you produce'. There are many associated factors but we will discuss each one of them in the next paper that follows shortly.
The answer to the second one lies in determining the proper amount based on mathematical calculation of three factors.
(1) Carrying charges or the holding charges: Stock holding cost over a period of time and related costs along with blocking of capital and related expenses are the costs closely responsible to adversely affect the basic cost of the production.
(2) Shortage cost is the most important one to be considered which on its inception will loss the goodwill of the company. On the top of that it goes against the fundamental tenets of the P^3 system.

(3) Inventory management cost: With every order that the company receives from the different buyers the top management refers to the inventory management department which is supposed to retain latest status of the stock. Dispatch time and cost are to be calculated and proper logistic chain is essential to plan before dispatch.

5. Conclusion

The factors discussed above are the immediate points of scrutiny which should be taken in account before any stage of the P^3 system. These are liable to cancellation of any order or seriously affect the business restraining its expansion.

6. Vision

The future vision in this area is to technically design a maximal comprehensive system that is capable enough to further analysis in important components and to restructure a system that requires minimum human intervention and yet runs the business professionally sound.

Annexure-A

As said earlier in the introductory part, results of feedback/ telephonic communications are as follows. We have gone through responses submitted to us on a request questionnaire prepared by us. The request has been distinctly responded by 14 corporations. We have, without any bias, have shown statistics of the results. Readers are kindly requested to abridge the gaps if found any.

Sr. No	Factor	Total affirmative answers out of 14 respondents	% response with Yes	Acceptance limit (≥ 75%)
F01	When to procure	11	78.57%	Accepted
F02	How much to procure	12	85.71%	Accepted
F03	Cost of Procurement	4	28.57%	Not accepted
F04	When to produce	11	78.57%	Accepted
F05	How much to produce	11	78.57%	Accepted
F06	Organizational profile of vendor/ supplier	5	35.71%	Not accepted
F07	Documentation/ Record keeping	8	57.14%	Not accepted
F08	Quality Assurance	13	92.86%	Accepted
F09	Distribution Management	11	78.57%	Accepted
F10	IT management/ ERP availability	11	78.57%	Accepted
F11	Shelf life (long time between Mfg. Date and Exp. Date)	13	92.86%	Accepted
F12	Easy availability (lead time)	12	85.71%	Accepted
F13	No shortages (No stock out situation)	13	92.86%	Accepted
F14	Easy access for customers/ customer relationship	11	78.57%	Accepted
F15	Schemes for bulk purchases	11	78.57%	Accepted
F16	Payment terms / Funding & Liquidity	11	78.57%	Accepted
F17	Customer feedback review/ coordination	11	78.57%	Accepted
F18	Staff Knowledge & Skills	7	50.00%	Not accepted
F19	Transfer Prices/ Affordable Pricing	11	78.57%	Accepted
F20	When to stock	11	78.57%	Accepted
F21	How much to stock	11	78.57%	Accepted
F22	Market returns	8	57.14%	Not accepted

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