

Smarter Operations at Manufacturing Organizations with Product Centric Model

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Abstract—Product centric model of operations is a customer focused and business value driven model of operations which has shown quantifiable benefits on adoption at manufacturing organizations. This paper proposes that adoption of product centric model of operations at manufacturing companies makes immense business sense and yields improvements in areas such as agile business delivery, cost management and creating an intelligent enterprise to reduce waste and improve customer satisfaction levels. The paper also outlines key drivers of such transformation, role rationalization for product centric organization and governance and metrics to measure success of the transformation. The benefits accrued at the manufacturing company the researchers worked with are also outlined.

Keywords— *Product centric model, agile, devops, manufacturing, operations*

I. NEED FOR PRODUCT CENTRIC MODEL AT MANUFACTURING ORGANIZATIONS

This Large organizations across the services spectrum are transforming from project centric operations to product centric way of working. Customer centricity is driving this transformation as product centric organizations put customers at the center of everything they do. Such a transition in way of working is largely dependent on how information technology solutions are deployed in the said organization.

In this paper the researchers focus on the importance of product centric way of working for manufacturing organizations which are looking to transform the way they interact with customers by revolutionary use of new digital technologies. The researchers also look at agile, lean and DevSecOps practices that play an important role in an organization's transition to product centric way of working keeping in mind the key role played technologies such as AI/ML, cloud, computer vision, AR/VR etc.

At the onset, manufacturing organizations should focus on shift to product centric way of working in areas which show promise to deliver innovation and digital enterprise. For example, at one of leading electric product manufacturers, the transformation to use existing data for creating services & products for end consumers was initiated because of the

realization that they have tremendous data which can be used to generate game changing analytics.

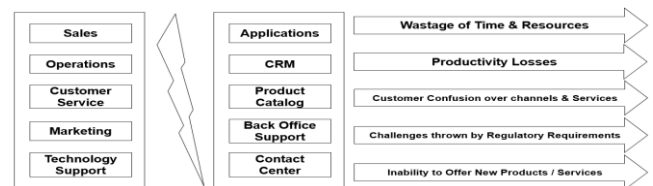


Fig. 1: Current State of Play in Most Manufacturing Organizations

Fig. 1 outlines current state of play at most manufacturing companies where organizational silos is reflected in application silos leading to customer challenges in understanding the products and services offered as also in productivity losses and increase in reaction times to changes demanded by business and regulation.

In most manufacturing companies the researchers have worked with, there are silos in existence in the business units which are reflected in how the applications supporting those business units are organized and managed. This leads to duplication of effort, work, applications, tools as well as wastage of time, money and resources. Customers are often confused about multitude of service offerings and various channels. There is also loss of knowledge and internal organizational confusion about usage of products, channels & IT services. The researchers have also noticed an inherent delay in the manufacturing organizations in responding to challenges thrown by changes to regulation and / or business environment.

In the researchers' experience, manufacturing companies wish to create customer relationships from end to end starting from customer on-boarding to the end of relationship such that customer satisfaction is ever improving. This reflects in B2B as well as B2C relationships.

Customers now interact with various manufacturing companies via several channels that include social media, self-service, telephone, email and so on. Such communications may include marketing communication, sales & billing communication and other transactions. This means that all channels must be able to offer seamless customer experience while consistently focusing on ensuring value delivery to various kinds of customers (B2B, B2C).

II. KEY DRIVERS TO MOVE TOWARDS A PRODUCT CENTRIC ORGANIZATION

In this section, the focus is on identification of key drivers in a manufacturing company to move towards a product centric way of working. Fig. 2 depicts four key focus drivers for such a transformation which are then explained as under.

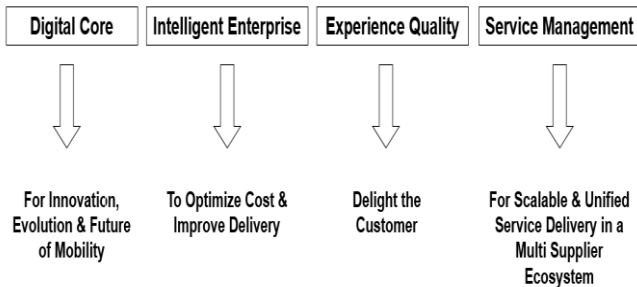


Fig. 2: Key Drivers to Move Towards Product Centric Model

The four key drivers as shown in Fig. 2 are:

- Digital Core - to evolve, innovate as well as leverage cloud, DevSecOps & agility to support the business
 - DevSecOps practices & agility from ideation to sunset
 - Encourage innovation
 - Digital ready systems
 - Focus on Product value
 - Lean planning & maintenance
- Intelligent Enterprise - to optimize cost & delivery of services and encourage innovation
 - Automation to support business agility of the manufacturing company
 - Autonomous operations to support supply chain, post-sales support & customer management
 - Decisions based on insights drawn from customer & market data
 - Focus on innovation of products, services offered and customer engagement
- Experience Quality - focused on improving customer experience
 - Product centric service delivery
 - Business agility
 - DevSecOps practices
 - Experience centricity
 - Product & experience focused metrics
 - Command center aligned with business
- Service Management - & integration for scalability and unification of service delivery in the manufacturing organization while retaining a multi supplier ecosystem as needed
 - Continuous improvements

- Standardized deployment & integration management
- Collaboration in a multi supplier scenario
- Service lifecycle management
- Information technology service delivery performance management

The manufacturing company the researchers worked with decided to transform to a product centric organization to ensure processes, people, workflows and decisions powered the organization's ability to

- Customize services and offers
- Improved and faster response to customer requests
- Consistent & distinguished cross-channel experience for customers
- Boost productivity
- Eliminate waste

III. SHIFTING FROM TECHNOLOGY TO PRODUCT CENTRIC ORGANIZATION

The product centric model of delivery uses Agile, DevSecOps and Lean principles for strategic planning to ensure uncertainties and lack of information do not derail the delivery of services to end customers. Product centric model places importance on relatively shorter horizons of budget & effort planning over massive planning at the beginning of a financial year. This is important as a manufacturing company is likely to be able to plan better for a quarter at a time (dynamically) rather than a complete year. This not only ties well with the goal of business agility but also ensures improved planning and budgeting as there is more information available about business goals a quarter at a time. The new teams, organized around business capabilities, as shown in Fig. 3 then plan the product backlog, execute, test and deliver business value to business and customers continually.

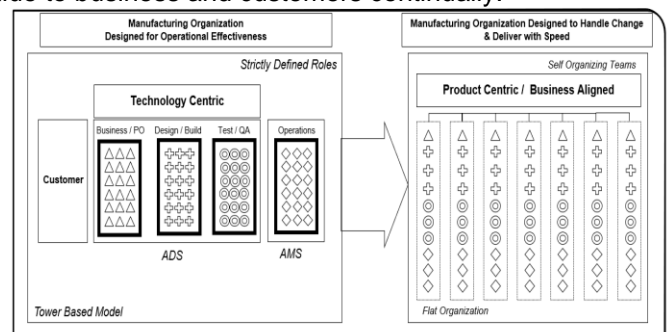


Fig. 3: Shifting from Technology to Business Aligned Value Streams or Product Centric Organization

The manufacturing organization also wanted to change and improve their technology centric solutions to help with forecasting and data analytics. The product centric organization helped with this goal as well. As shown in Fig. 3, people organization to product centric way of working also helped identify gaps for closure and aided creation of self-organizing

teams that then took on the goals of the organization to address all the identified gaps, including in areas of forecasting and analytics.

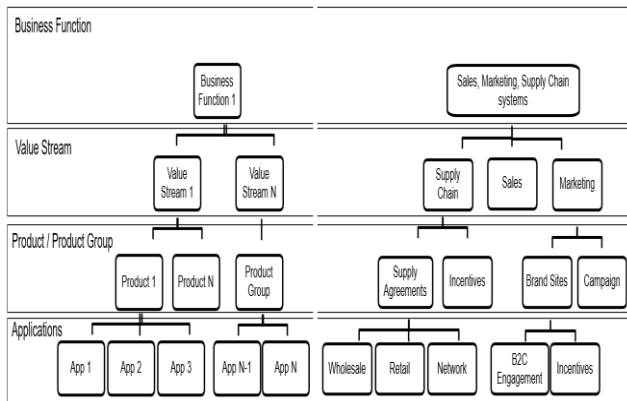


Fig. 4: Organization Design – Sample Product Centric Model for Manufacturing

Fig. 4 shows a sample organization design for product centric model and an example organization of the manufacturing company the researchers worked with. The figure also shows breakdown of the structure from business function to value streams to products or product groups and finally applications delivering value all the while ensuring that the goal post of customer centricity is at the center of every decision.

IV. ROLES RATIONALIZATION FOR PRODUCT CENTRIC ORGANIZATION

It has been the researchers' experience that such a transformation requires enthusiasm and inclination from the leadership team as it will lead to changes to culture as well as organizational roles and will also need revamped or upgraded skill sets. There are some best practices that can be utilized such that one does not reinvent the wheel. Some such best practices would include focusing on:

- Quick and continuous learning to support product development
- Addressing rapidly changing business requirements
- Data & Analytics requirements for the present and future
- Security management
- Putting product centric transformation at the front and center of every decision - for each line of business within the organization
- Defining quantifiable goals and measuring them

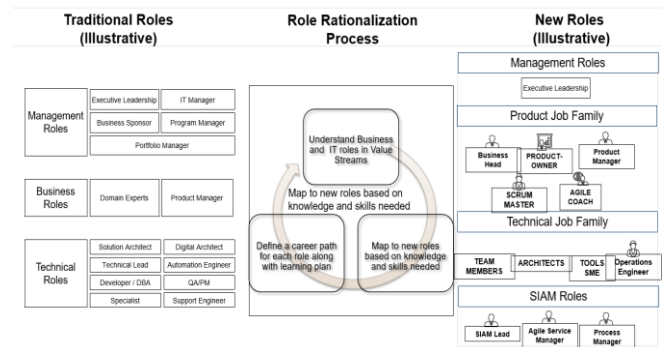


Fig. 5: Role Rationalization for Product Centric Organization

Fig. 5 depicts one of the key areas of focus when transforming to a product centric organization – it shows how traditional roles go through role rationalization process and transform to new roles in a product centric organization.

The process begins with understanding the business and information technology (IT) roles in value streams within the manufacturing company, defining a career path for each role along with a learning plan and then its mapping to new roles based on knowledge and skills needed. The role rationalization exercise would focus on management, business as well as technical roles and rationalize them.

V. GOVERNANCE & METRICS

A very important part of the creating and adopting a product centric model of functioning at a manufacturing company includes focusing on governance of the transformation process as well as business results accrued from the transformation. It is the researchers view that this kind of transformation is successful only if the relevant metrics and measures show business benefits from the exercise. The acceleration and adoption of agile & DevSecOps practices on the technology side can be tracked through qualitative adoption measures. This leads to product level performance improvement resulting into "better products & faster delivery" with "product" delivery mindset focusing on "customer centricity" leading to trends in

- Improved quality
- Reduced information technology cost
- Faster time to market
- Improved business satisfaction

It may be noted that these four are qualified metrics recognized across industries as some of the best metrics to measure improvement from DevSecOps adoption. This and researchers own experience leads them to submit that DevSecOps practice adoption is a key best practice while transforming to product centric organization. The researchers suggest the following metrics and measures be focused upon:

- Adoption Measures
 - Adoption Maturity
 - Operational Excellence
 - Skill / Competency Index
- Product Team Level Measures – measured at team level / sprint level
 - Stakeholder satisfaction measures such as Product owner demo satisfaction
 - Productivity measures such as team velocity, throughput
 - Business effectiveness measures such as business value delivered per feature, requirement readiness cycle time
 - Quality measures such as % automated unit test coverage, test effectiveness
- Product Group Level Measures – measured at product family level per month or quarter
 - Cost of rework
 - Lead time to change
 - Release frequency
 - Cost of requirement change
 - Application stability
 - Mean time to recover
- Portfolio Level Measures – measured at portfolio level per quarter or half year
 - Customer satisfaction index
 - Delivery satisfaction index
- Coaching Effectiveness
 - Coaching feedback
- Team Satisfaction Metrics
 - Team happiness index
- Team's Self Organization Quotient
 - Product ownership
 - Team health
 - Technical health
 - Sprint health

VI. POTENTIAL AREAS OF BENEFIT FOR A MANUFACTURING ORGANIZATION

In the experience of the researchers, there are at least four core areas in which a manufacturing company can expect to experience quantifiable benefits from transformation to product centric model of operations. They are:

- Plan & Budget
 - A product centric model recommends funding of product teams rather than complete initiatives planned several quarters in advance. Respect for cadence and customer centricity ensure that each funding or planning decision is made in near-real time with maximum amount of relevant information made available to the planning team.
 - The researchers have found that cost and time are most valued commodities in a tightly run manufacturing company. This means that in place of having pre-planned

budget defined at the beginning of a year, a transformed manufacturing company has initiative level and team level budgeting as needed and revised frequently.

- Improvement in prediction of timelines, effort and benefits of an initiative because of cadence and timeboxing inherent to the product centric model.
- Another area where quantifiable improvements can be seen is validation of funding. A product centric model ensure money, effort and time are allocated based on the validation of investment already made in an initiative. The relatively shorter timelines of delivering business value ensure that a team can evaluate business value delivered while making funding decisions to continue an initiative.
- Capacity Management
 - The key focus is on creating a virtuous cycle of improvements in every area of delivery. There has to be alignment with business and continuous delivery of business value. Hence each product team pulls work based on predicted capacity which in turn ensures prioritization of most critical work items, referred to as "Minimum Viable Products (MVPs)".
 - The cost of waiting and cost of delay are also reduced to near minimum by the product centric model because of its alignment with customer and business.
 - The revitalized manufacturing organization also focuses on value delivery with quantified business benefits over delivery of products or services for a given scope.
- Program Governance
 - The governance in product centric organizations is about exercise of control on quantification of benefits. As the researchers have explained, all work is focused around business value delivery, cadence, minimum viable products (MVPs) and so on. This makes it possible to pick measures & metrics with direct business connection to quantify benefits. Such metrics would be related to use of products & services, revenue, customer satisfaction and so on. In fact, they could be any of the ones discussed in the previous section.
 - The focus in a product centric organization is on constructing the

“right things” the “right way”. Rationalization of cost, elimination of waste and focus on business value are direct by-products of this focus.

- All decisions are made based on quantification of improvements and business value delivery as stated in the previous section.
- Demand Management
 - Management of demand and continuous visualization is an area where benefits are accrued as needs & ideas flow into the strategy filter continually from several sources. The program, portfolio and product backlogs are derived from this continuous pipe on a regular basis to ensure best ideas are picked and innovative solutions get developed.
 - In traditional way of working where a detailed case and design is created before a requirement is worked upon, the product centric model allows to continuously elaborate light use cases to ensure value is correctly calculated and assigned to each use case. Each use case undergoes a cost-benefit analysis based on various business criteria which work very well for a manufacturing company as money is not put / lost in large and / or unviable projects for long periods of time.
 - The prioritization is done to ensure maximum returns. The program, portfolio and product backlogs are continuously evaluated to ensure that there is a cost-benefit sense to each item that becomes a part of a product delivered to business and customer.

VII. CONCLUSION

The researchers found that product centric model helped the manufacturing company optimize interactions between the manufacturing organization and the customer. Many benefits (and not limited to) as stated below were quantified:

- Product teams created customized maintenance plans for efficiency, cost or comfortable service
- The final goal of improvement in reliability was achieved
- Incrementally move towards a "business as usual (BAU)" relationship with regulatory changes

The researchers also found that the product centric model at the manufacturing organization helped bridge the data divide to improve data & analytics usage and enable creation programs in the following areas:

- Create pre-paid services
- Cross selling opportunities

- Products & services that the customers are most likely to use
- Optimized service and prediction mechanisms to create plans to encourage timely services
- Improve pattern recognition for material misuse and fraud management
- Targeted marketing and sales campaigns

It is therefore considered opinion of the researchers that the product centric model of operations offers quantifiable benefits to manufacturing companies and can be considered for adoption.

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