Infosys®
POWERED BY INTELLECT
DRIVEN BY VALUES

White Paper

Improve your odds with Infosys Predictability

? Right Questions | ! Business Insights | + Integrated Solutions | × Value Multipliers

Integrated Part Information Management

Bridging Information Gaps Across Functions

- Jagmeet Singh & Ashish Kumar Tewary

More than 70% of the global aerospace companies have their parts sourced from all across the world. With globalization and economic liberalizations, aero-OEMs (Original Equipment Manufacturers) are increasingly relying on subsidiaries and vendors located in different parts of the world for parts supplies. This globally distributed operation, spread over time zones, has created a lot of challenges. Distributed operations lead to competency silos and locally-trapped information . One such effected area is part information. The ***scope***, ***richness*** and ***content*** of part information, along with ***timely*** and ***consistent*** part data availability to all the value chain partners is becoming more important than ever before.

Companies are under pressure to reuse existing engineering artefacts and information about parts across product development programs to reduce development costs and lead time. However, part data management procedures and tools are still highly fragmented and rudimentary. The practices and systems are out of synchronisation with business requirements. And part data is stored and managed in multiple systems and with multiple ownerships. The other challenges faced by the aerospace industry in managing part data:

1. *Non-centralized part database increases the effort to trace part information*
2. *Lack of traceability of part information is a constraint in part reuse*
3. *Late-stage part changes are not registered appropriately*
4. *Material information is not captured for End-Of-Lifecycle (EOL) management*
5. *Non-standardized part metadata among the supply chain members leads to delay in product launch*

May 2006

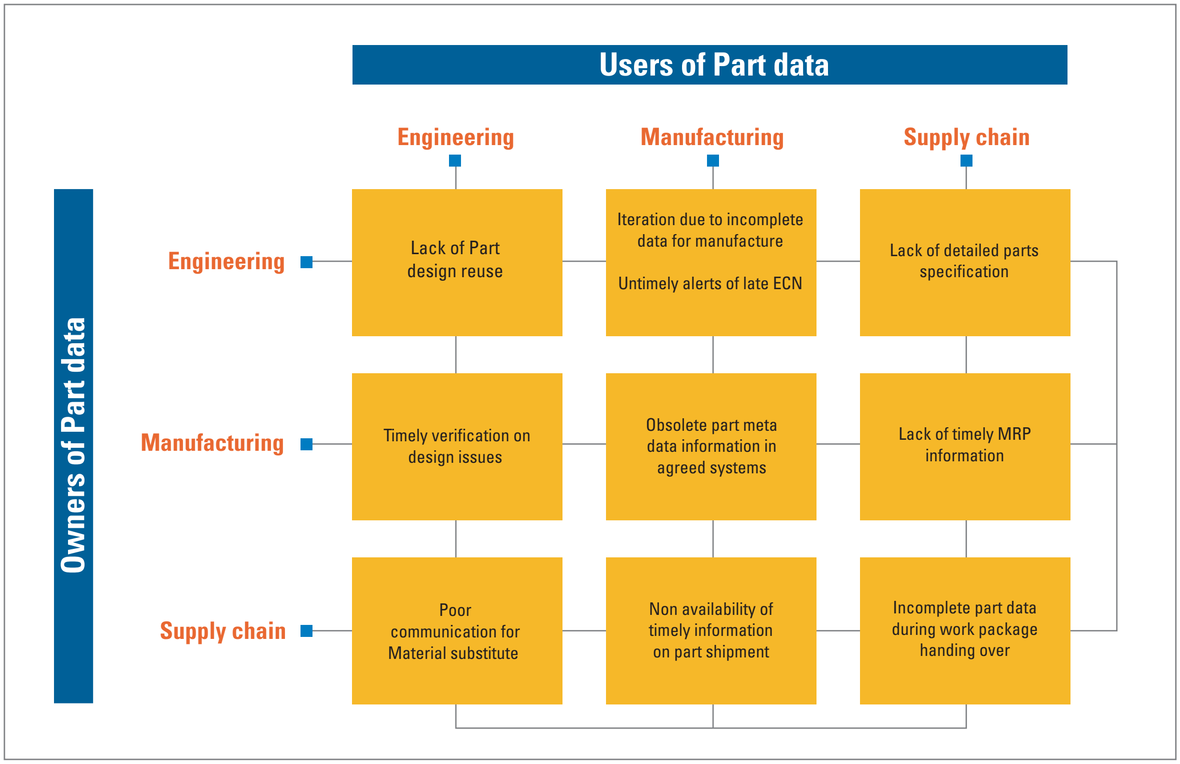


Exhibit 1 : Business pain points across functions due to non-availability of timely and needed part information

Exhibit 1 highlights the issues in part information management and the following industry experiences reinforce them:

- Though we have the part information, it is difficult to find information on new suppliers
- We created a part and later got to know that it was available in the earlier used Computer Aided Design (CAD) application. We could have re-used that part
- Parts required for a program have to be fetched from two different systems, which can be very tiresome
- After a part is released into the system, the quality department asks for a replacement due to its non-compliance with environmental regulations

Exhibit 2 : A Tier-1 had to examine 400 drawings to get the material specification for parts

To meet RoHS & WEEE standards, a tier-1 supplier had to collect information on the material used in parts. As there was no centralised database having this information, the team had to go through each of 400 drawings! It was a very tedious and costly affair and delayed the start of new programs where the company had to use RoHS & WEEE approved parts.

Non-centralized part database increases the effort to trace the part information

Almost all manufacturers have, at some point of time invested in part databases to ensure existence of updated information. However, this investment is usually made to meet localized requirements of departments/ subsidiaries. So, it does not support newer requirements due to changes in the external environment. *Exhibit 2* is a typical case in the lack of centralized part database.

Exhibit 3 : OEM found redesigning almost 3500 identical parts

An OEM undertook a major collaborative design work in which several parts were designed across the globe using different CAD applications. During one of the exchanges, it was realised that identical parts were being redesigned by collaborative teams whereas they could have simply been converted to the desired application, exchanged and thus, reused. Almost 3500 cases of such duplication were found.

Lack of traceability of part information is a constraint in part reuse

Today, parts are bought and sold in multiple geographies. Most parts have high reuse potential. Even if parts have to be modified to meet varied regulatory standards, the effort required would be less than that required for creating the parts from scratch.

Exhibit 3 looks at an OEM that had manufacturing units spread across the world. After long operations, it realised that designers were creating new parts to meet the compliance specifications of particular regions. This resulted in the duplication of the parts which, in fact, could have been avoided if they had a Integrated Parts Information Management using Product Lifecycle Management (PLM) systems.

Late-stage part changes are not registered appropriately

Many times, part designs are changed at a very late stage due to non-compliance with the specifications. In these cases, part release does not follow the regular release process of design to prevent delays in the final assembly lines. These parts are the outcome of 'accommodated designs' that are mostly managed on paper. The information history of such parts does not exist at a granular level, but only at the broader level in the data management systems. During the failure of the product these parts become bottlenecks in reverse traceability.

Material information is not captured for End-Of-Lifecycle (EOL) management

The degradation of hazardous materials from disposed-off equipments and parts cause environmental pollution. EOL management needs OEMs and their suppliers to have information on non-hazardous materials early in their life cycle, to ensure that a complete part or its component is recycled, redesigned and reused after the parent product is disposed off. Presently most OEMs and their suppliers, however, do not maintain this type of part information at a detailed level and mange existing information through non-scalable/ disintegrated spreadsheet-based systems.

Non-standardized part metadata among the supply chain members leads to delay in product launch

The aerospace industry is adopting concurrent engineering with its supply chain partners to cut down the product development lead-time. Concurrent way of working demands frequent exchange of part metadata in the supply chain. However, in the global supply chain

Exhibit 4 : Product launch was delayed by six months due to non-standardized part meta data exchanges

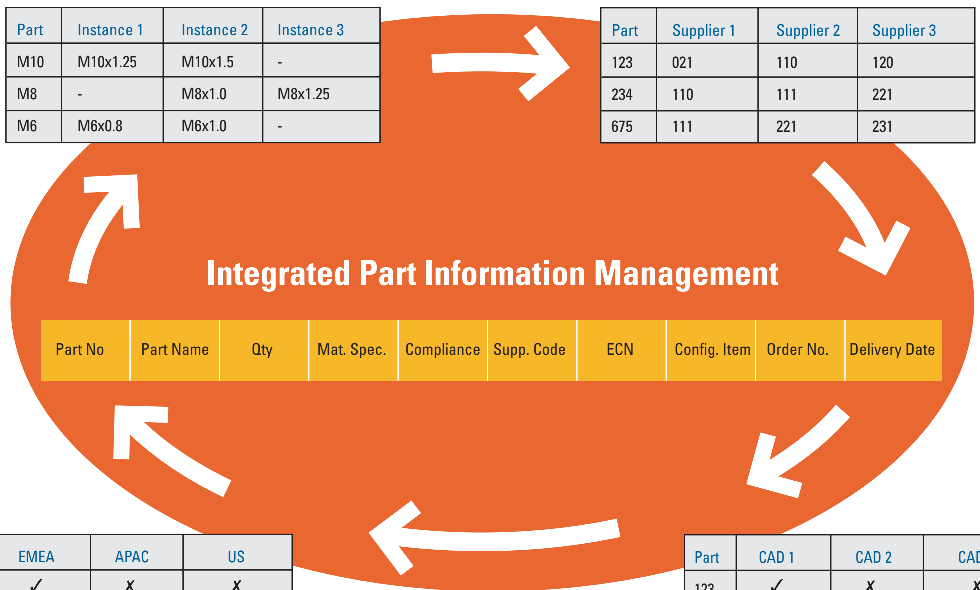
A design & build supplier supplied the finished part, but its release into the OEM PDM systems was delayed by straight six months. This happened due to differences in part numbering, part configurations etc. between the supplier & OEM. The certification process at OEM was delayed due to non-traceability and inconsistency of part information.

where the suppliers are spread across geographies, concurrent way of working creates newer challenges and delays in integrating the pieces of information being received from each supplier. *Exhibit 4* depicts one such case.

Integrated Part Information Management (IPIM)

Aerospace organisations are becoming more vigilant and vibrant towards market dynamics and are exploring new frameworks and solutions that serve "fit-for-all" functionality. They are looking for frameworks with centralized part databases to save access time, standardized metadata formats for faster information flow, supplier information that enable faster traceability

IPIM in action



Similar Part

Part	Instance 1	Instance 2	Instance 3
M10	M10x1.25	M10x1.5	-
M8	-	M8x1.0	M8x1.25
M6	M6x0.8	M6x1.0	-

Supplier Codes

Part	Supplier 1	Supplier 2	Supplier 3
123	021	110	120
234	110	111	221
675	111	221	231

Part	EMEA	APAC	US
123	✓	✗	✗
234	✗	✓	✓
675	✓	✓	✗

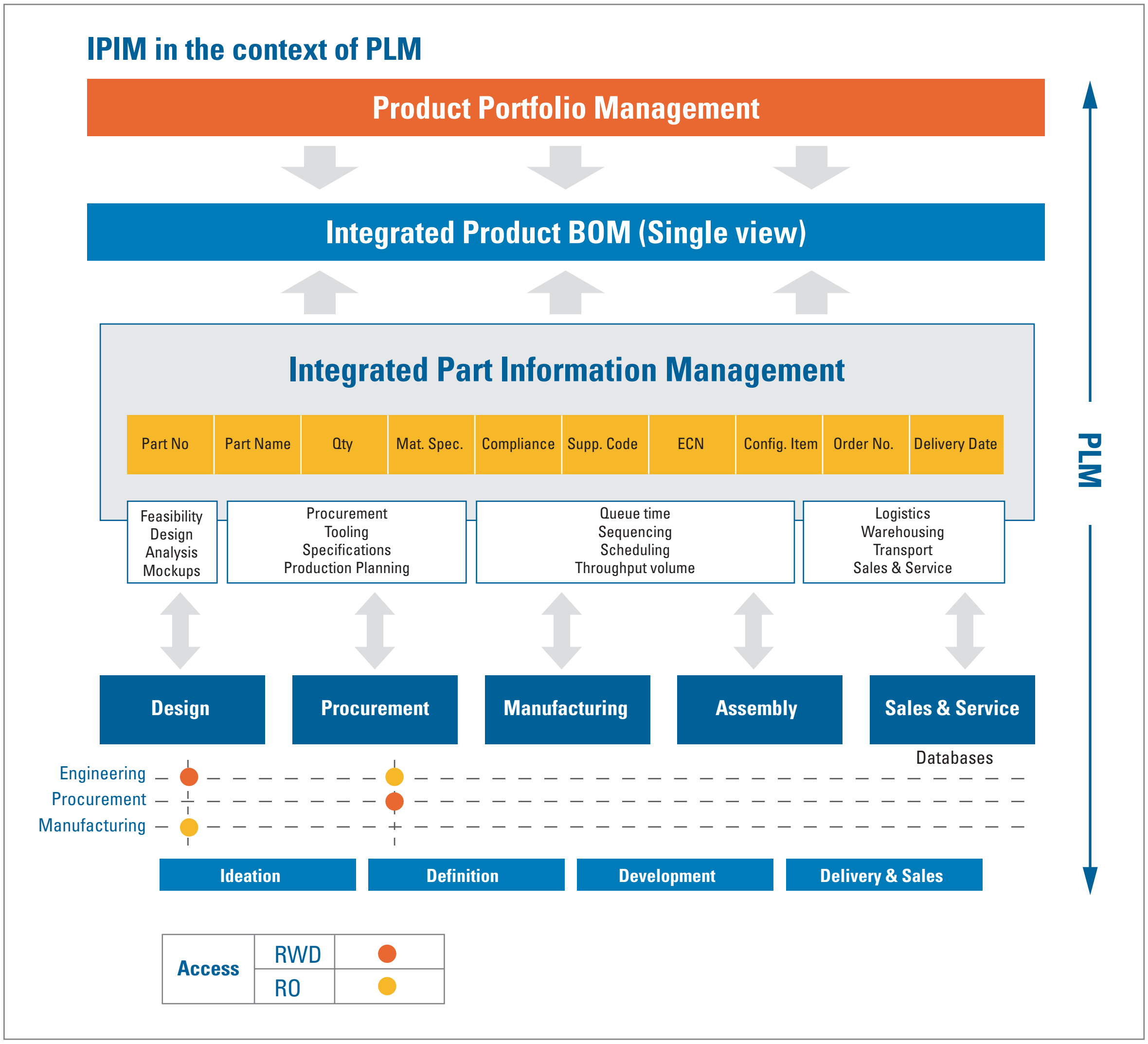
Compliances Validity

Part	WIP	Defined	Released
123	✓	✗	✗
234	✗	✓	✓
675	✓	✓	✗

Part Data Evolution

Part	CAD 1	CAD 2	CAD 3
123	✓	✗	✗
234	✗	✓	✓
675	✓	✓	✗

Reuse & Interchangeability



etc. The increased scope, richness and content of part information along with the increasing importance of timely availability of part data to all the value chain partners is demanding a solution that supports:

- Integrated part database
- Part data traceability
- Part data evolution over the product life cycle
- Part Reuse & Part interchangeability
- Material specifications for regulatory compliances
- Standardized metadata exchanges

Integrated part databases enable IPIM through feeds from different upstream databases related to design, procurement etc. IPIM, in turn, provides part data information to Integrated Product Bills of Material (IPBOM). Invariant configuration items represent IPBOM. The part data for each configuration item is provided by the designated product structure shared across value chain partners in the IPIM. This allows part data traceability and part reuse. Engineering can also register part interchangeability options in IPIM to provide flexibility to downstream functions and thus, help in reducing delays due to non-availability of a particular part.

The part data is evolved in a controlled manner through tight user-access control. This also enables concurrent engineering, as downstream functions can refer to the evolving part data for decision-making. So, for example, as soon as a part is released, the procurement / manufacturing can start buy or make actions, customer support can begin to prepare technical documents etc. The IPIM database can also be made accessible to suppliers, by managing permissions and user groups. This would reduce the burden of exchanging the huge data and compromising on the bandwidth.

IPIM captures the material specifications details for parts specified by EOL regulatory authorities. A search on parts can provide information about all the applicable regulations. This eliminates the difficulties of creating and maintaining spreadsheet-based solutions in the global supply chain.

This highlights that any information in a product development would ripple through this integrated information flow, thus maintaining maximum part traceability in a PLM environment. IPIM maintains information about not only the specifications, but also the part supplier, manufacturing workstation, materials required, logistics, warehousing, etc. by providing "Navigation" functionality. All the cross-functional databases are centrally connected to the IPIM database, to ensure that information can be retrieved and used "anytime, anywhere, any-item".

One of the areas where IPIM has been found highly effective is "standard parts management". Since suppliers are not usually allowed to create standard parts on their own, creating a separate area for standard parts and sharing the same with collaborating teams and external suppliers would save huge amounts of duplication, data management and inconsistency issues. This would also help in meeting different specifications for different geographies, as the information for the same would exist in the "one common database" for all, thus fulfilling the real essence of IPIM.

Illustrative Success story

A large global OEM developed a parts database as a module of their supplier relationship management application. Engineers search this database before creating original part designs through an integrated new-part-generation application. As a result, intra-division part reuse has grown from 2% to more than 30%, annual part-number-reductions ranges from 20% to 38%, and year-to-year savings have been as high as US$240M.

Conclusion

The scope, richness and content of part information, along with timely and consistent part data availability to all the value chain partners are becoming more important than ever. However, part data management procedures and tools are still highly disintegrated, rudimentary and out-of-sink with business requirements. Integrated Part Information Management is a solution approach that bridges this gap, by integrating the various business functions across the extended enterprise so that part related information can be retrieved and used "anytime, anywhere, any-item". It facilitates organizations derive huge benefits through increased part reuse and interchangeability, improved traceability, regulatory compliance, improved concurrent engineering; and reduced duplication, data management and inconsistency issues.

About the Authors:

Jagmeet Singh is a Consultant in Product Lifecycle Management Consulting Group with Infosys Technology Ltd (NASDAQ: INFY). Jagmeet has 8 years of experience in the areas of CAD, FEA, PLM and ERP-SAP with Fortune 500 clients of automotive and aerospace domains.

Ashish Kumar Tewary is Principal in Automotive & Aerospace Solutions Consulting Group with Infosys Technology Ltd (NASDAQ: INFY). Ashish has more than 12 years of experience in the areas of product development & supply chain management with leading automotive and aerospace companies.

POWERED BY INTELLECT
DRIVEN BY VALUES

www.infosys.com