Achieving Operational Excellence in Pharma & Biotech

Adapting best practice to meet the unique characteristics of the industry

Executive Summary

With the pharmaceutical industry currently going through major transformation, improving productivity and reducing costs by implementing Operational Excellence is increasingly important for business success.

Pharma and biotech companies can benefit significantly by adapting the experience of other industries who have implemented similar tools and methods.

In this paper we

- Discuss particular characteristics of the pharma & biotech industries that need to inform the approach to Operational Excellence (Opex)
- "Demystify" Opex Implementation best practice
- Illustrate how to "get started" on the Opex journey
- Share case studies to illustrate our approach

Process Insight understand the business challenges, have deep experience and have relevant answers. Whether you are looking for a solution to specific problem or the design and delivery of a full Opex programme this paper will outline how you can cut through the potential complexity in order to identify a pragmatic & practical way forward.

We are very proud winners of the 2013 Chemical Industries Award for Manufacturing & Resource Efficiency. Many things have contributed to our success but critical has been learning how to adapt Opex best practices from other industries to make them work in our highly regulated environment.

Helen Ogden, Site Director, Macfarlan Smith

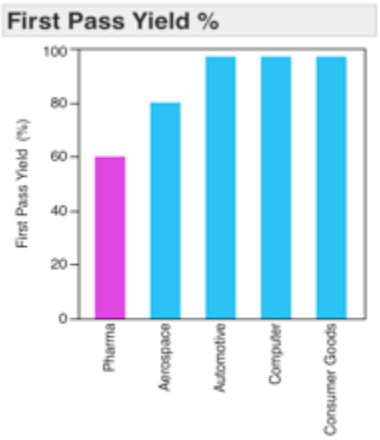
Introduction

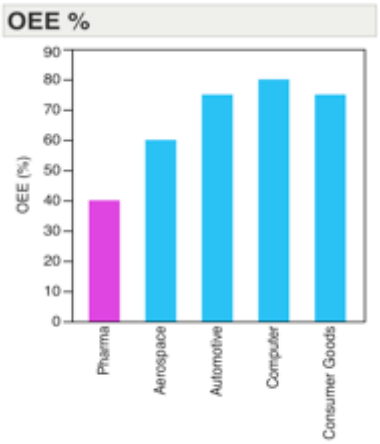
The need is increasing for pharma and biotech industries to exploit Opex best practice to meet growing pressures on innovation, productivity and cost.

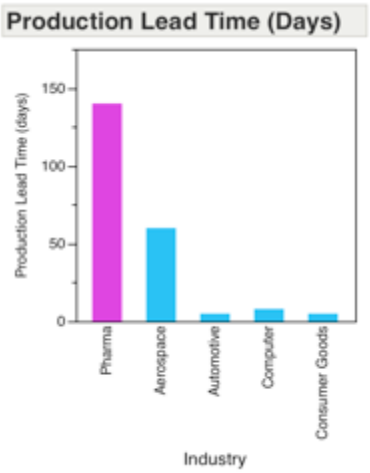
The opportunity for Opex improvement in pharma is considerable. Despite being highly profitable, pharma is several years behind the performance curve of other industries. This is illustrated overleaf with a comparison of pharma with other industries based on typical Opex benchmarks.

The potential prize from Opex improvement is high. However, the pharmaceutical industry has particular aspects that need to be taken into account and knowing how to best approach Opex activities in this environment is not straightforward.

A Comparison Of Pharma With Other Industries Using Typical Opex Benchmarks







Data source: Mckinsey & Co. Quoted in The Gold Sheet 2009

Rising To The Opex Challenge

Fortunately there is much evidence that, if addressed correctly, significant changes in operational performance can be achieved. Typical problems that Process Insight have helped pharma & biotech companies address recently include:

- Removing bottlenecks to increase capacity of manufacturing units
- Increase uptime & OEE improvements on critical equipment
- Reducing lead times for product release
- Reducing errors in QC documentation and improving batch record "right first time"
- Reduction of supply chain lead-time through improved planning and information flow

Some examples are given in case studies later in the paper.

Every industry has unique characteristics which present specific challenges and determine how the Opex approach needs to be tailored.

In the case of pharma and biotech these can be summarized as follows:

- Regulatory compliance places a high burden on process change
- cGMP practices require that even minor process changes follow rigorous protocols and change control procedures with consequent impact on timescales and resources
- The pharma industry has been built on foundations of functional excellence. Regulatory compliance has re-inforced this functional focus. This represents an impediment to "end to end" value stream optimization which underpins best practice common in other industries.

Adapting Opex Best Practice To The Industry

A successful Opex implementation approach in pharma & biotech manufacturing needs to be built around:

- Early engagement with QA/QC to establish how improvement activities can be best aligned with change protocols to facilitate rapid progress whilst meeting regulatory/compliance needs

- Emphasis on identifying high impact/high benefit improvement projects that can be tackled without regulatory impact. These could include, for example,
    - OEE and uptime improvements
    - Secondary processes (e.g. tableting, packaging, warehousing & logistics)
    - Streamlining documentation & product release procedures
- Initial focus on the Opex foundations (5S, visual management, lean daily management) – this will deliver significant benefit and can be done without any risk to compliance. It will also start to "break down" functional silos.

Demystifying Opex Implementation

Opex implementation can be confusing – there are a myriad of tools and methodologies. It can be difficult for leadership to align behind an agreed way forward and this uncertainty can be a barrier to moving ahead with Opex activities.

To help "demystify" the approach this paper specifically considers four aspects particularly relevant to pharma & biotech businesses starting out on the Opex journey

- Exploiting relevant best practice
- A simple roadmap to launch Opex activities
- Tailoring the Opex toolkit
- Simplifying data analytics

Exploiting Relevant Best Practice

There is plenty of Opex best practice available to provide direction to an organisation navigating the improvement journey.

Process Insight have developed an "easy to use " self - assessment tool which encapsulates this knowledge in a practical way (described in more detail overleaf).

The tool, built from experience in many industries, provides an easy to understand framework for

- Establishing current state of Opex maturity
- Identifying gaps and improvement opportunities
- Identifying barriers
- Developing strategies to overcome these barriers
- Implementing the changes
- Tracking progress towards a best practice vision for the organization.

The tool can be used as a one-off, stand-alone assessment to launch initial activities or more regularly to review & focus Opex activities on an on-going basis

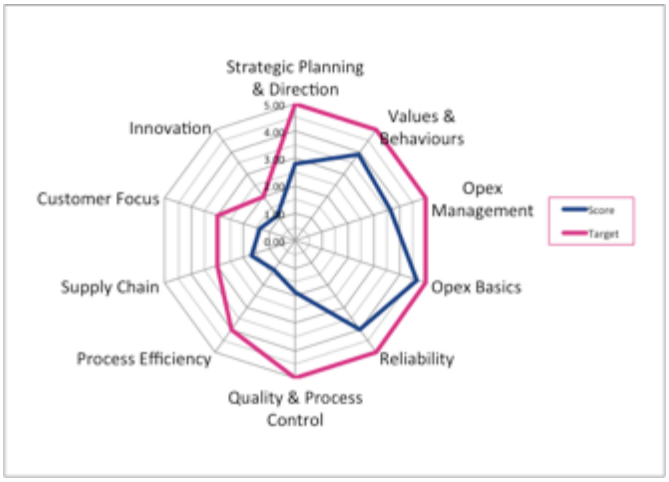
Establish your organisation's Opex maturity – visit the Process Insight stand at the conference or call +44 (0)7785 927144 or +44 (0)7860 622166 for more details.

Process Insight Opex Assessment Tool

- This is a diagnostic tool that enables assessment of current Opex activity against foundations and areas of Opex best practice selected according to specific business needs & priorities
- A small number of straightforward assessment questions allow current state to be assessed, gaps and opportunities identified, & progress tracked towards a clear goal.

	Assessment Topics	Operational Excellence Best Practice Vision
Foundations	Strategic Planning & Direction	A clear strategy which everyone understands drives the business & sets a clear direction for operational excellence across the business
	Values & Behaviour	The organisation ethos & culture reflects a strong commitment to excellence & continuous improvement
	Opex Management	The Opex programme is fully integrated into business leadership activities and treated as a critical aspect of business strategy delivery
	Opex Basics	The basics of a sustainable Opex programme are in place everywhere including 5S, Visual Management, and commonly used problem solving methods
Areas of Best Practice **Opex Best practice areas are selected for assessment according to business priorities**	Reliability	All plant equipment runs without unplanned minor stops/ breakdowns and with a continuous reduction of the maintenance cost
	Quality & Process Control	Organisation supports a zero defect system through process control to minimize Cost of Poor Quality and to improve customer satisfaction
	Process Effectiveness & Efficiency	There is optimum use of manpower and equipment to meet customer requirements in the most profitable way
	Supply Chain	The business produces to meet customer demand in the minimum time and at the maximum productivity & profitability
	Customer Focus	The organisation drives business growth through meeting customer needs…profitably
	Innovation & Growth	Operational excellence enables innovation & growth to support sustainable business success

Output from assessment enables clear identification of gaps and prioritisation of actions to drive Opex activities forward in line with business goals.



A Simple Roadmap To Launch Opex Activities

In pharma & biotech the regulatory environment drives a culture which is highly risk averse. To make Opex work it is essential that significant emphasis is placed on building confidence to demonstrate that process improvement is readily achievable if done in the right way. (i.e. taking appropriate account of regulatory & cGMP requirements)
Key elements of the approach include

- Training in basic lean & problem solving tools
- Engaging early with QA & QC to demonstrate how these can be integrated with existing protocols & change procedures
- Selection of first wave projects that can be tackled without regulatory impact
- Use of Kaizen events to tackle problems and engage broad range of workforce in the "improvement" process
- Delivery of some quick & visible benefits

It's very easy to lose focus. The Opex implementation roadmap we developed with Process Insight has been enormous help. It has made sure we keep our eyes clearly fixed on the prize.

Steve Bagshaw, Managing Director, Fujifilm Diosynth Biotechnologies

A Roadmap To Launch Opex Activities

Initial Opex Assessment
- Complete initial assessment
- Identify opportunities & gaps and potential projects
- Engage with QC/QA to establish alignment between process improvement and existing change procedures & protocols

Leadership Education & Project Selection Workshop
- Engagement & Alignment of Leadership
- Selection of first wave projects
- "Sign off" on start up plan & resources

Training
- Kick off training in Opex Foundations, DMAIC project & Kaizen methods

Deliver First Wave Projects & Benefits
- Launch improvement projects
- Support successful project delivery & secure benefits

Launch Opex Foundations
- Work teams implement Opex Foundations (5S, Visual Management, Lean daily management processes)
- Work team Kaizen events

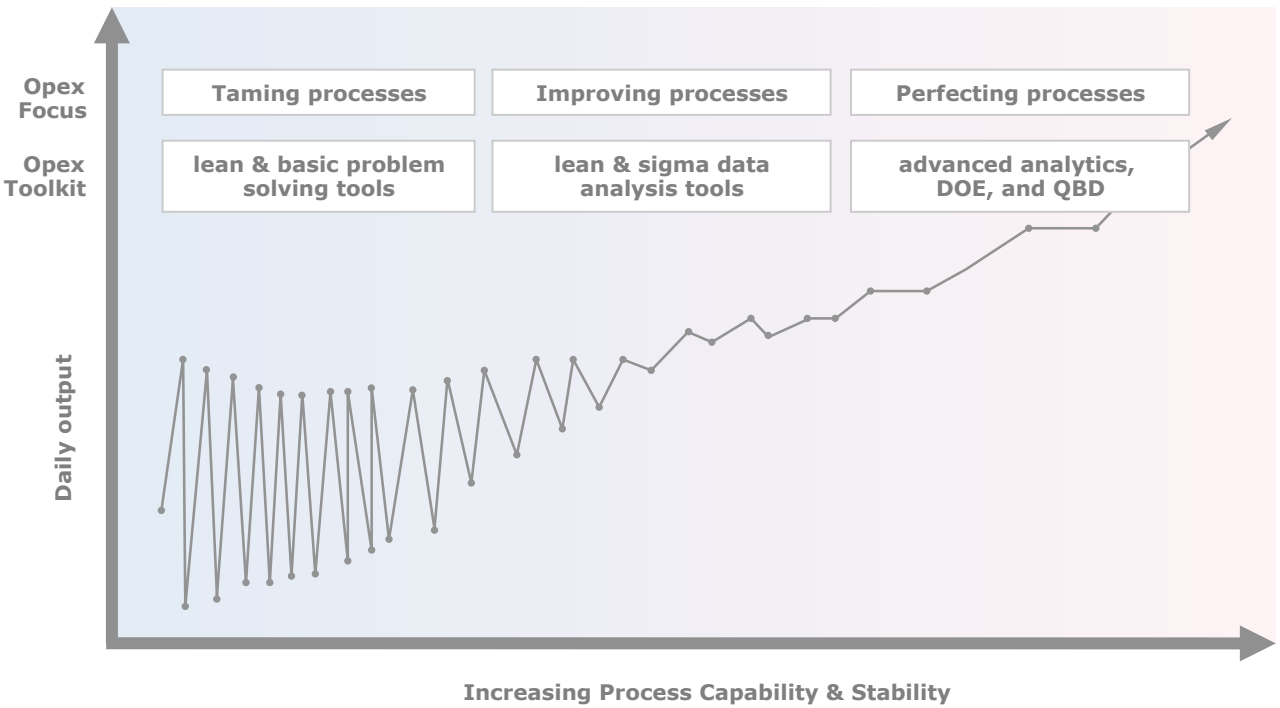
Sponsorship & Governance
- Leadership involved to "pull through" activities.

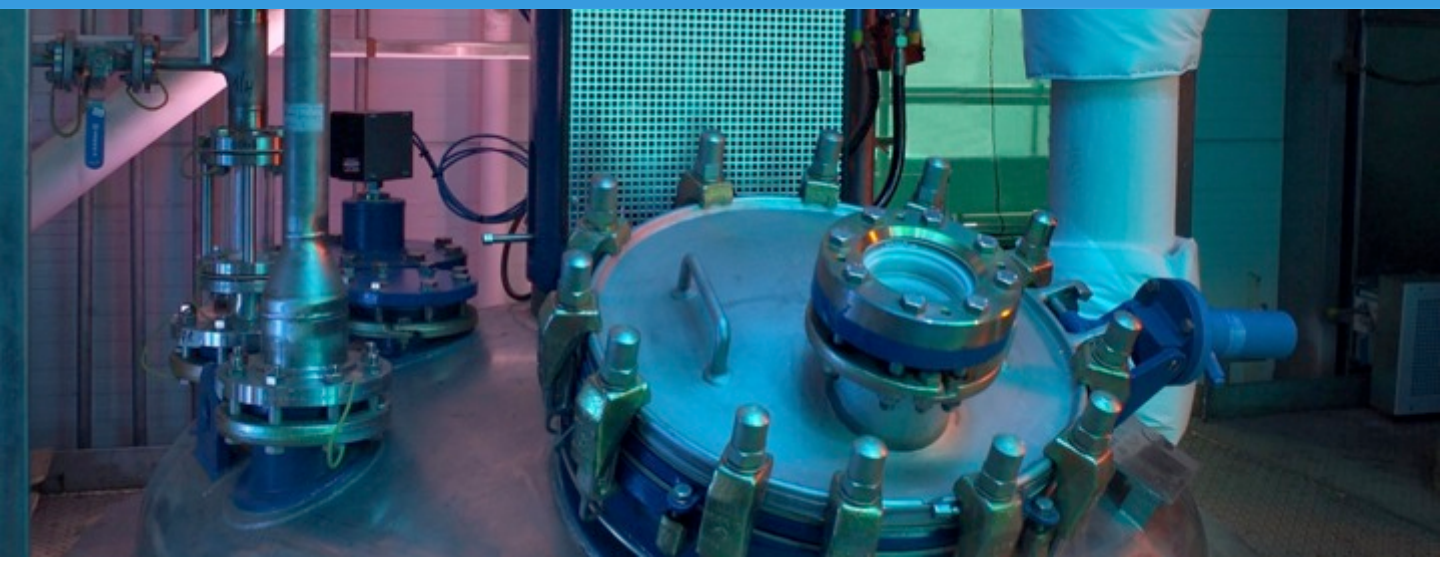
Develop Roll Out Plan
- Opex re-assessment
- Develop plan for broader roll out

Tailoring The Opex Toolkit

"Sheep dipping" everyone in the complete range of lean & sigma tools is costly, wasteful and ineffective and will result in confusion & resistance. For those starting out in Opex it is important to tailor and adapt the toolkit to suit business and individual team needs.

The appropriate tools for driving improvement in a particular environment depend on the maturity and stability of processes under consideration as illustrated schematically below:





Similarly, the deployment of the tools can be through project teams targeted on specific problems and/or by deployment of problem solving tools through work teams engaging the broader workforce in continuous improvement & kaizen events.

An initial Opex assessment will provide the basis for

- understanding the process maturity
- establishing the right toolkit
- defining who needs to be trained and what tools they need to be trained in
- defining the right mix of projects and work team kaizen events to tackle the process problems, build confidence and develop widespread engagement.

Simplifying Data Analytics

Similar to other process industries pharma & biotech manufacturing operations collect large amounts of process & quality data. This is a highly valuable resource to be exploited in process improvement. However to be utilized effectively requires data analysis techniques to be simplified and moved outside the world of expert statisticians.

Process Insight have worked closely with JMP® in the development and roll out of new approaches to make process data analytics much more accessible to non-specialists.

In contrast to traditional statistical testing these new approaches put the emphasis on structured exploration and "discovery" with data – generating powerful data "visualisations" which can be shared widely & easily & quickly turned into useful predictive process models. The techniques are robust & underpinned by rigorous statistical analysis but unlike traditional methods are very fluid and engaging in their application.

Because of this process data can be much more easily interrogated and new insights rapidly generated to drive process improvement activities.

Data analytics needs to be much more "user friendly" to support our Opex activities . The visual data discovery approach developed by JMP® & Process Insight is a massive step forward which has helped enormously.

David Payne
Head of Continuous Improvement
Macfarlan Smith

Find out more about this exciting new approach to data analytics– visit the Process Insight stand at the conference or call +44 (0)7785 927144 or +44 (0)7860 622166 for more details.

Summary
Until recently pharma and biotech industries have been highly profitable. The strategic emphasis has been on developing a pipeline of new drugs rather than on productivity improvement, supply chain optimization, and cost reduction. Consequently the industry is lagging behind the "performance curve" on operational excellence. There is much best practice available from other industries that can be exploited but this needs to be done in a way that recognizes the specific characteristics of the pharma & biotech environment.

Embarking on Operational excellence activities can be daunting and confusing with a myriad of alternative approaches and techniques. This becomes even more challenging when driving changes in a highly regulated environment which are risk averse and where process changes need to be tightly controlled.

In this paper we have outlined a simple framework we have developed which

- Enables Opex best practice approach to be adapted to pharma environment
- Provides low risk way to get started and keeps the leadership team's "eyes on the ball"
- Informs selection of the appropriate Opex toolkit to suit the organization needs
- Rolls out simplified data analytics beyond statistical experts to engage broader workforce in data driven problem solving

Whether you are looking for a solution to specific problem or the design and delivery of a full Opex programme this paper illustrates how to cut through the potential complexity in order to identify a pragmatic & practical way forward.

About Process Insight Consulting
Process Insight Consulting delivers Operational Excellence consulting and training throughout Europe

Visit our stand at the conference to discover how we help organisations solve problems & build capability.

A small selection of our case studies are presented in this paper. Come and talk to us about our experience and see a wider range of case studies addressing various aspects of pharma and biotech manufacturing.

www.process-insight.eu

Case study

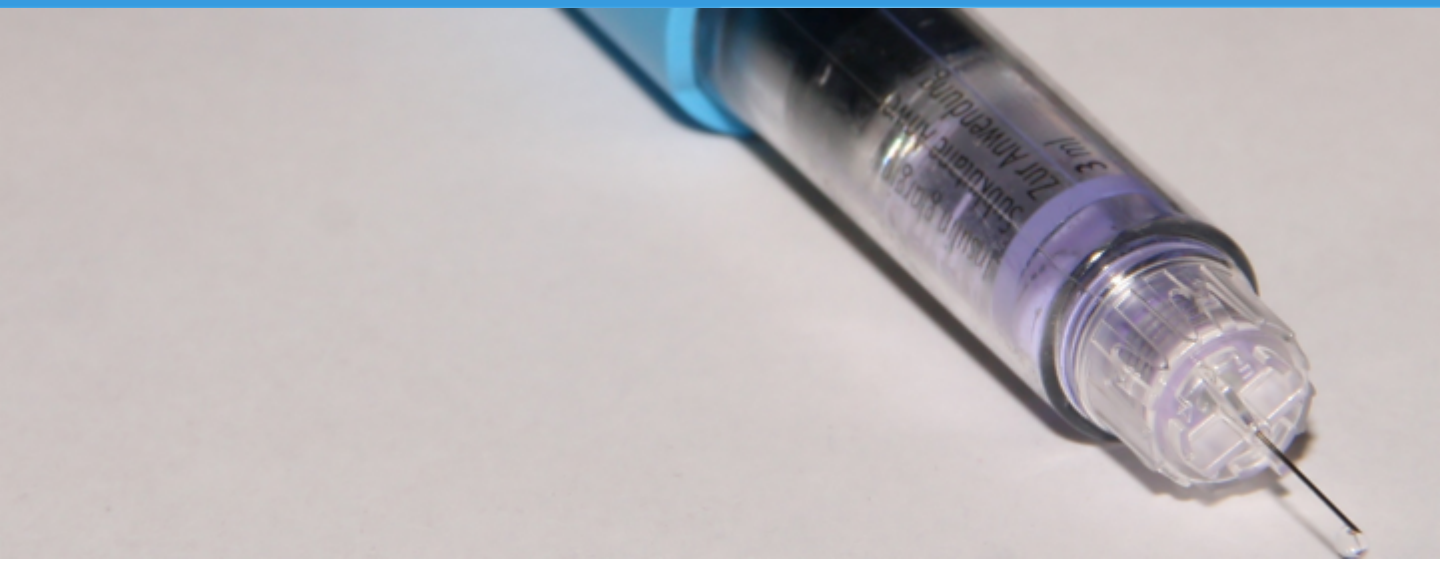
Product Release Lead Time Reductions

Business Background & Context	**Final product release lead-time was too long due to quality and processing issues with documentation**
Problem & Goal	The batch documentation for a complex sterile product was very complex. The 'right-first-time' (RFT) from documentation for final batch release was <10% and release lead-time after the final processing step was too long (4 days) The goal was to dramatically improve RFT and to reduce the lead-time
What was Done	• Documentation was simplified (remove unnecessary activity) • A Documentation Room (D-Room) was created to allow documents to 'flow' through the process with errors being quickly corrected • Structure was added to documentation activities • Visual Management techniques were employed • Documents processed in sequence rather than 'by preference'
Business Impact	Documentation RFT improved to >90% Lead-Time dramatically reduced 4 days to <1 day Documentation seen as core part of the process rather than a necessary evil

Case study

Innovative Training Methods To Reduce Deviations

Business Background & Context	**A global biotech company suffering significant losses due to delays in starting up production. Additional major costs incurred in rework associated with deviation management.**
Problem & Goal	In one year alone the formulation support team raised 88 deviations during the ramp up phase of 98 process change projects. As a result, 25% projects were delivered late. The goal was to reduce the number of deviations during ramp up of production during process change by 50%.
What was Done	3 day kaizen event involving operators and technicians. Key Improvements • A more effective, standardized method of training operators in new validation protocols. • Operator involvement in defining the content and the most effective method of training to meet their needs • Clear definitions of roles and responsibilities during validation protocol training and process management • A template for the training manual which trainers adapt to meet the specific needs of the process change protocol (SOP) • Weekly process reviews with operators to review issues, propose and implement solutions and sustain the improvements
Business Impact	Three month after implementation ZERO deviations were raised during 20 validation runs. Operators also reported that the new training methods removed a lot of the frustration and rework. Estimated annual savings of over €700,000.



Case study

Data Discovery – Medical Device Quality Improvement

Business Background & Context	**Rare event defects in medical devices resulted in high volumes of scrap and major supply chain interruptions at the customer.**
Problem & Goal	Medical devices were produced in large batches on very high volume manufacturing lines. Batches were sampled using a destructive test. Occasionally very low levels of defects (ppm level) were detected. Complete batches of suspect product had to be scrapped. The goal was to better understand the problem and to improve yield and OTIF.
What was Done	• Rigorous statistical analysis of historic test data (over half a milliion tests !!) to identify possible factors (e.g. production lines, products, components and test machines). • Design of Experiments to identify root causes • Changes to product design, manufacturing conditions, test machine calibration, sampling strategy
Business Impact	Scrapped batches and major supply chain disruptions were reduced by a factor of 3. Major cost savings and customer confidence was greatly increased

Process Insight

Contact us
Tel +44 (0) 7860622166
or +44 (0) 7785927144