

Are your business processes a black box?

How process mining demystifies your processes and helps you steer towards operational excellence







Table of Contents

1	Welcome	4
2	Summary	5
3	Business processes are recognised as the backbone of every company and are the drivers of operational excellence	6
4	Companies have no or little view on the process flow. As a result, they don't have the insights to steer where needed	8
5	Analysis shows processes often flow in many different ways, and all too often in ways other than were designed	10
6	Process mining can demystify your business process and help you see where and how you can (and should) steer to improve	11
7	While process mining can provide insights, the question remains: all of this is very nice, but how can we put it to action?	14
8	How PwC adds value with process mining	16
9	Process mining vendors in a nutshell	17
10	PwC contacts	18

1 | Welcome

In a business world ruled by new technologies, automation initiatives and other digital innovations, many companies are struggling to turn their business processes ('processes') into an enabler for operational excellence. As processes are often considered a 'black box', how can you effectively manage them?

As a proponent of guiding clients from Strategy through Execution, PwC understands the importance of effective and efficient processes. Process excellence allows companies to effectively bring the value their customers, shareholders and society are looking for. Process mining is one of the techniques that has surfaced in the past few years. It represents a powerful way of visualising the actual process flows based on data, therefore providing an objective view of a process: no more subjective perceptions by process owners on how the process

should flow. No more consultants conducting a series of workshops to understand the 'as-is' process – just an objective view based on data.

PwC questioned over 170 companies across 21 countries on how they're controlling and steering their business processes towards process excellence. This report summarises these results and provides insights into how process mining techniques can enable operational excellence by demystifying your processes and enabling you take concrete actions. We thank all respondents for their valuable input.

Discover the recipe for operational excellence by gaining insights into your processes and taking the appropriate actions based on those insights. Let's turn the black box into a white one!



2 | Summary



Companies recognise the importance of processes contributing to operational excellence, but are often unaware of process performance (and of deviations from the expected performance)



Strategic business decisions are often steered based on black box processes, assumptions, or incorrect information



First global PwC process excellence publication



Process mining techniques reveal insights based on process data. These objective insights allow you to take the right measures and to steer towards operational excellence



Although software vendors are responding to the interest and opportunities in process mining, permanent process mining solutions and implementations are not yet widespread across companies



Over 170 questionnaire respondents across 21 countries



Participating countries

- Russia
- Austria
- Belgium
- Germany
- Italy
- Turkey
- Luxembourg
- United Arab Emirates
- Spain
- United States
- Netherlands
- United Kingdom
- Australia
- Bahrain
- Egypt
- Japan
- Saudi Arabia
- Oman
- Belarus
- Switzerland
- Ukraine

3 | Business processes are recognised as the backbone of every company and are the drivers of operational excellence



85%

of respondents review
the as-is process state
at least periodically

Many definitions exist of what a business process is or should be. Simply put, a business process is the interaction of a human network, often supported by IT, with the aim of adding value to the company. The extent to which a process contributes to company's success heavily depends on the efficiency and controllability of the execution.

On top of that, digitalisation is here to stay, and its impact on company processes will only grow. In Gartner's Market Guide for Process Mining 2019, Marc Kerremans states that digital business and transformation are major themes, and that processes are important constituents in the operationalisation of these initiatives. We see companies react by investing time in designing to-be processes to reach optimal value, but very often they lose traction with the process and its post-implementation success rate suffers. Ironically, it's mainly this traction that's needed to further transform and optimise processes and raise a company's value.

The Harvard Business Review article 'What Process Mining Is, and Why Companies Should Do It' (by Thomas H. Davenport and Andrew Spanyi) echoes this by stating: "In business process re-engineering, organisations are primarily interested in an improved to-be process, so often they have little interest in exploring as-is, or how the process is currently performed. But understanding the current process is critical to knowing whether it is worth investing in improvements, where performance problems exist, and how much variation there is in the process across the organisation."

Awareness that business processes are key drivers of operational excellence was confirmed by the questionnaire: 85% of respondents review their as-is processes at least periodically and attempt to adapt their way of working accordingly. Almost half (47%) mentioned a process optimisation function within their organisation, which is a crucial element in a structured approach towards company-wide process improvements. Indicative of the eagerness of companies to strive for process excellence is the low number of participants (two) not actively pursuing process optimisation.



4 | Companies have no or little view on the process flow. As a result, they don't have the insights to steer where needed.



50%

indicated not using
advanced techniques like
process mining to capture
process insights

Whereas companies acknowledge the relevance of well-designed business processes, the actual performance of these processes is very often a black box for management and even for process owners. Process insight is, however, the very knowledge needed to steer the organisation in the right strategic direction. We see multiple factors that contribute to a blindfolded view on processes, but essentially they all relate to a higher level of complexity originating from within the company:

- a. Increasingly divided responsibilities and trends towards automation triggered by large-scale business transactions.
- b. End-to-end processes being supported by different systems and teams.
- c. Acquisitions and centralisation where legacy processes are retained (or abandoned at a slow pace) within local entities, causing discrepancies with the central entity.

According to 41% of questionnaire respondents, it's mainly the complex IT landscape (not uncommonly consisting of legacy systems) that challenges companies to measure and maintain process quality.

In the pursuit of process information, companies tend to rely on assumptions, subjective information, and stand-alone KPIs that potentially reveal pieces of information, but not how their processes operate as a whole. Half of respondents indicated they didn't use advanced techniques to capture process insights and were limited to stand-alone KPIs, manual techniques, or even no techniques at all. Of those surveyed, 66% admitted that current information sources didn't allow them to capture basic process-related insights like time spent on redundant activities, process deviations, or root-cause analysis.

This widespread ignorance about process performance shouldn't be underestimated by companies starting or continuing their digital journeys. Despite the consensus about digitising a black box process being good idea, too often investments in technologies miss opportunities or simply fail because of insufficient understanding of the current process. As an example shown by many use cases, before automating an accounts payable process, information on first-time-right, potential duplicate payments and current payment lead times are key pre-implementation insights.



5 | Analysis shows processes often flow in many different ways, and all too often in ways other than were designed

Only by monitoring the actual performance of processes will companies see to what extent the process execution deviates from the expected path. Without this insight at hand, companies don't know, or worse, don't realise the elevated number of process variations the moment strategic decisions are due. Unfortunately, triggered by the complexity of current processes, the way they are executed varies more than companies would like or expect. Being involved in process audits and optimisation projects over the years, advanced data techniques like process mining helped us uncover process insights for enterprises in various industries and of different sizes. For the vast majority of clients, the high number of process variants and deviations from the expected path greatly exceeded management's expectations.

Looking at how respondents assessed their process performance, 49% indicated their documentation wasn't aligned with the actual process driven by adaptations and alternative process variations over time. On the other hand, 51% of respondents claimed their process execution was fully in line with documentation and that deviations were impossible because of automated process flows. Knowing that only 14% of the 51% were familiar with process mining techniques, and based on our own experience, we conclude that the majority of respondents were unaware of their process performance, so they tended to overestimate the level of standardisation.

Decreased harmonisation clearly affects the controllability and efficiency of their processes. Companies that realise this anticipate or react by (re)designing processes and systems for a more standardised way of working. Nevertheless, these good intentions are often limited to theoretical concepts that get stuck after the design phase. It's the lack of monitoring tools that very often makes these initiatives miss their mark.

6 | Process mining can demystify your business process and help you see where and how you can (and should) steer to improve

One of the most advanced techniques available to gain an understanding of the performance of processes and to overcome the knowledge gap companies experience is process mining. According to the IEEE(*) Task Force on Process Mining (in 'Process Mining Manifesto', 2011): "The idea of process mining is to discover, monitor and improve real processes by extracting knowledge from event logs readily available in today's systems. Process mining includes process discovery, conformance checking, social network / organisational mining, automated construction of simulation models, model extension, model repair, case prediction, and history-based recommendations."

Where traditional techniques of process discovery are based on stand-alone analytics or subjective interviews, the technique of process mining offers management a single source of truth originating from objective data available within the information system. The power of process mining is the end-to-end view on the process, built up from the lowest level of detail, the transactions, and allowing for both high-level and drilled-down visualisations.

The concept of mining process flows based on event logs, in combination with powerful analytical tools, offers process owners and management a window to unlimited process information. As such, it can act as the GPS that steers an organisation in the right direction.

Despite its advantages, the deployment of process mining within business still has a long way to go. Although 93% of all questionnaire respondents stated they wanted to apply process mining within their organisations, 79% indicated never having used this technique. Budgetary reasons notwithstanding (mentioned in 24% of cases), respondents perceived three main challenges preventing the adaptation of process mining:

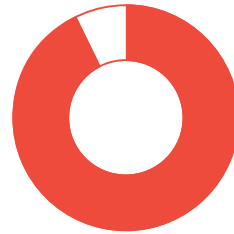
- Unavailability of process mining tooling or expertise (52%)
- Limited focus due to a missing process function (33%)
- A complex IT landscape (30%)

It's relevant to note that all three can be overcome by involving partners with the right expertise.



79%

of respondents have
never used process
mining



93%

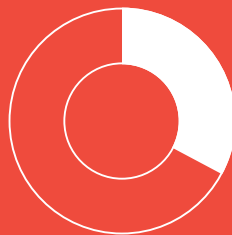
want to apply process
mining within their
organisation

Challenges seen in using process mining:



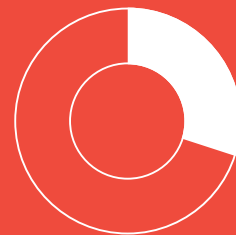
52%

Unavailability of process
mining tooling or expertise



33%

Limited focus because
of a missing process
function



30%

A complex IT landscape

We also asked respondents in which areas they saw the most opportunities for process mining in the future. With procurement process optimisation (22%) and audit and control-related activities (19%) as the most common answers, the outcome wasn't a surprise. Although we've experienced concrete success stories of process mining within these areas, we also believe areas like customer services, financial transactions, warehouse management and IT resolution processes, among others, would benefit from process mining, mainly given the high number of transactions and the complex IT environment linked to these processes.



A new light on HR inefficiency

The HR department was a sitting target in a company's struggle to quickly acquire talented personnel. With the help of process mining techniques, we could investigate the root causes behind the delays within the recruitment process. Looking at the lead times between separate process steps, we discovered that the most time was wasted in the (mis)communication between the HR team and the requesting business team, and not within the HR team as such. Root cause analysis uncovered poor job vacancy descriptions coming from the business team and slow response time on clarifying questions raised by HR. This acquitted the HR team, significantly changed the attitude within the business and led to shorter recruitment cycles in the end.



7 | While process mining can provide insights, the question remains: all of this is very nice, but how can we put it to action?



Although process mining can lead to the discovery of new and groundbreaking process insights, it will start adding true value once turned into concrete actions that improve the process. We see that translating insights into actions is often challenging for companies considering process mining as a stand-alone data project. However, when shared with process stakeholders and combined with process and industry expertise, the stage is set to define the necessary steps for process improvements.

To define actionable optimisation steps, it's important to focus on the process areas that truly matter and that are feasible for improvement. Although process mining analysis offers you the possibility to work on the end-to-end process, a smart initial approach would be to go after the low-hanging fruit and realise short-term achievements. That way, a positive perception is set to convince stakeholders and management about the process mining-driven optimisation approach. More than elsewhere, management buy-in is key and staff will follow if advantages for the company are clearly defined.

To achieve employee buy-in, we advise companies to follow a simple yet structured approach:

- Consider the end-to-end process and check against the expected flow.
- Identify a limited set of striking anomalies or inefficiencies.
- Investigate and understand the root cause using process mining features.
- Calculate the optimisation potential and translate it into business value.
- Decide on feasible improvement measures together with process and industry experts.
- Share insights and ambitions with management.
- Develop a plan and a timeline to tackle uncovered opportunities in the mid-term.

Once implemented, monitoring the impact on process performance and company value will contribute to the effectiveness of the defined actions. Not only will the tools and processes be on hand and accessible within the process mining environment, the level of commitment by process users will be higher when they realise their efforts contribute to the company's value.

After having gained the first successes with process mining, the journey does not cease. Opportunities will occur almost automatically within other areas of the process or company, triggered by prior experiences. The factors mentioned above about feasibility and added value for the organisation are more important than ever and act as the basis for prioritising.

Unexpected gaps in approval flow

One of our clients was looking for the right balance between a lean and well-controlled purchase process. Through process mining we saw, on the one hand, that process lead times were rather short, contributing to process efficiency. On the other hand, by looking at the end-to-end process level, a significant number of transactions did not pass by any of the approval check points (order approval or invoice approval). Although the company had previously implemented thresholds for purchase order approvals, management was not aware of the total unapproved purchase value and the absence of approvals at the invoice level. As an action point, approval thresholds were decreased and periodic monitoring of end-to-end, unapproved purchase transactions was embedded.



8 | How PwC adds value with process mining

As outlined in this report, process mining techniques can be an enabler to achieve process excellence. There are multiple process mining tools on the market (see next section) that enable process owners to visualise process flows and deviations to the desired process flows. While it's extremely useful to gain these insights, it's crucial to take the exercise further and to be clear on your ultimate goals:

- **Are you analysing your processes in view of a new ERP implementation or a wider digital transformation exercise?**

We see, for instance, an increase in SAP S4/HANA migrations, whereby process mining techniques are very valuable in gaining insights into the as-is processes. These insights can then be leveraged in the decision of whether to opt for a greenfield or brownfield implementation, and provide a good base knowledge in view of the design of the new system.

- **Are you analysing your processes to find out what (sub)processes hold the most potential for further automating the processes within the existing ERP system, or for robotic process automation (RPA)?**

Process mining will show you the process steps with the most inefficiencies, or the processes with the highest number of sub-activities (potentially where a manual input or action is required), and as such will provide input in view of process automation using RPA. It will also provide you with a means to measure the effectiveness of your RPA initiatives after implementation.

- **Are you analysing your processes in view of analysing the effectiveness of controls, or as part of an internal audit?**

At PwC, we're supporting many internal audit teams who use process mining as a fast way to dig deep into a process, and focus the audit attention on the process flows and transactions that don't follow the expected path (with a focus on process and transaction anomalies).

- **Are you analysing your processes in view of making them more efficient and effective?**

For example, analysing which employees need more training, how well you're managing your working capital, how your operating models can improve, how well your sourcing strategies work, etc.






PwC not only provides clients with the technical expertise to implement and set up the process mining software, we combine our technical know-how with deep business knowledge and experience. We bring expertise to clients in many different functional areas, such as procurement, IT, finance, customer service, marketing, risk and controls, compliance, internal audit and more. The true value and power of process mining is in knowing what you want to achieve when applying process mining techniques and bringing the right functional expertise to the table. This recipe will enable you to bring process mining to the next level, beyond merely visualising your processes.

9 | Process mining vendors in a nutshell

Riding the wave of enthusiasm and optimism about process mining, more and more commercial and open-source software solutions are responding to the opportunities arising with this technique. Gauging respondents' tool preferences, the questionnaire results didn't reveal any specific software in particular. This outcome could be explained by the slower integration of process mining within the business, or by the specific software needs that diverge between companies.

Being a driver of process mining and its applications within the business, we're in contact with the various process mining software vendors. For information purposes, we've listed several process mining solutions that are currently on the market (note that this is not an exhaustive list).

When benchmarking the solutions, we see a significant overlap in features. Nevertheless, we also notice a trend in differentiation by focusing on visualisation and functionalities:

Product	Infrastructure	Focus area	Differentiator
	Cloud On-premise	<p>Removing friction from business processes across all functions of the organization with particular expertise in:</p> <ul style="list-style-type: none"> - Finance - Procurement - Supply Chain - Production - Sales & Order Management - System Migrations - ITSM - HR 	<p>Operationalizes process insights through next-best-actions and automations.</p> <p>Delivers quantified business results, while scaling to enterprise data and user needs.</p> <p>Offers +400 pre-built apps to optimize process outcomes and accelerate time-to-value.</p> <p>Offers Snap: the world's only free cloud process mining solution.</p>
	Cloud On-premise	<p>Real-time performance dashboards</p> <p>Customer journey interactions</p> <p>Social and organisational mining</p> <p>Improving process automation opportunities</p>	<p>Easy to use enterprise-wide</p> <p>Centre of excellence that aspires to make process mining an integral technology for large corporates</p>
	Cloud (Office 365) On-premise Microsoft PowerBI add-on for process mining	<p>Business process improvement</p> <p>Audit and compliance</p> <p>Big data and real-time dashboards</p>	<p>Enhancing current Power BI infrastructures with process mining</p> <p>Interaction with other Microsoft components for AI, collaboration, Q&A (NLP), automation and more</p> <p>Out-of-the-box Content Packs empower users to analyse, act and automate</p> <p>Free demo version in the Microsoft Store</p>
	Cloud On-premise	<p>Continuous monitoring and improvement</p> <p>Efficiency improvement and risk reduction</p> <p>Audit and compliance</p> <p>Digital transformation</p>	<p>Governed self-service user model</p> <p>Integrated and controlled extraction and loading of data</p> <p>Multidimensional process mining with multiple case IDs</p> <p>Innovative, patented process model</p> <p>Custom interface styling and branding</p>
	Cloud	<p>Automated discovery of system processes</p> <p>Low granularity level and visual conformance violation detection</p> <p>Process model enhancement and extension across different processes</p>	<p>Investigative process analysis</p> <p>Operational process performance insights exposed on process models</p> <p>Affordable process mining for a broader audience</p> <p>Specialisation in easy-to-use products in BPM/BPA and decision management</p>

10 | PwC contacts

Belgium:

Wim Rymen | wim.rymen@pwc.com

Thomas De Cuyper | thomas.de.cuyper@pwc.com

Vincent Gaukema | vincent.x.gaukema@pwc.com

Austria:

Markus Ramoser | markus.ramoser@pwc.com

France:

Carine Fotso | carine.fotso@pwc.com

Germany:

Marcus Messerschmidt | marcus.messerschmidt@pwc.com

Christian Bartmann | christian.bartmann@pwc.com

Michael Wittek | michael.wittek@pwc.com

Italy:

Dino Ponghetti | dino.ponghetti@pwc.com

Japan:

Yoshiyuki Kure | yoshiyuki.kure@pwc.com

Luxembourg:

Julie Batsch | julie.batsch@pwc.com

Middle East:

Cristina de Torres | c.detorres@pwc.com

Russia:

Grigory Borisenko | grigory.borisenko@pwc.com

Spain:

Rafael Rodriguez Rivera | rafael.rodriguez.rivera@pwc.com

Sweden:

Mats Andersson | mats.andersson@pwc.com

Fredrik Gran | fredrik.gran@pwc.com

Switzerland:

Dr. Rafael Accorsi | rafael.accorsi@ch.pwc.com

Turkey:

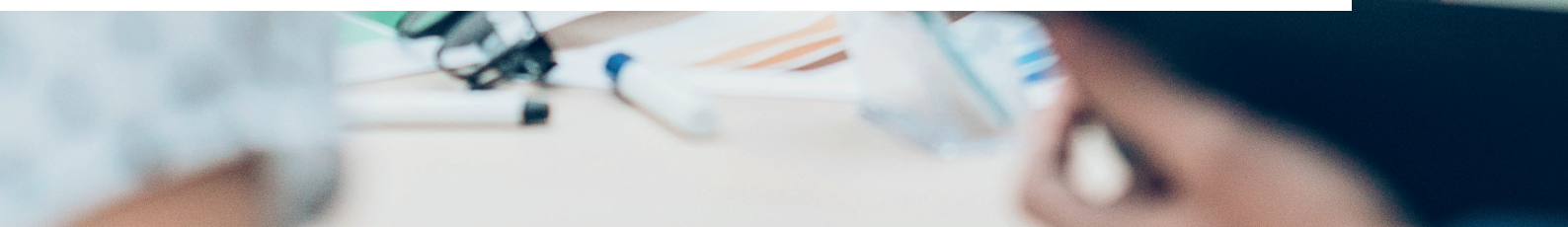
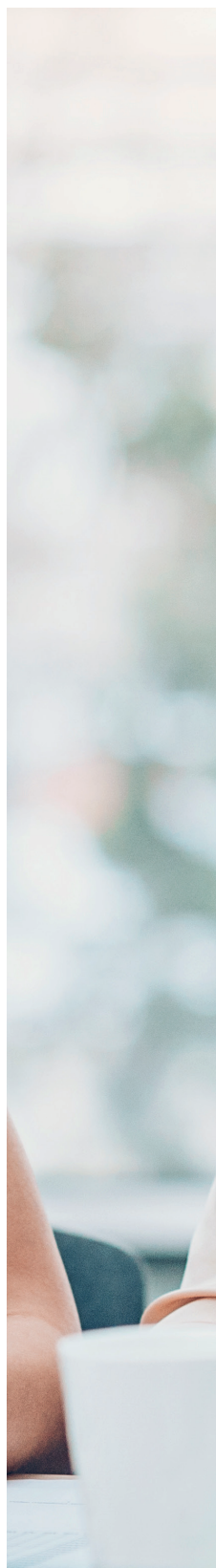
Mehmet Ermurat | mehmet.ermurat@tr.pwc.com

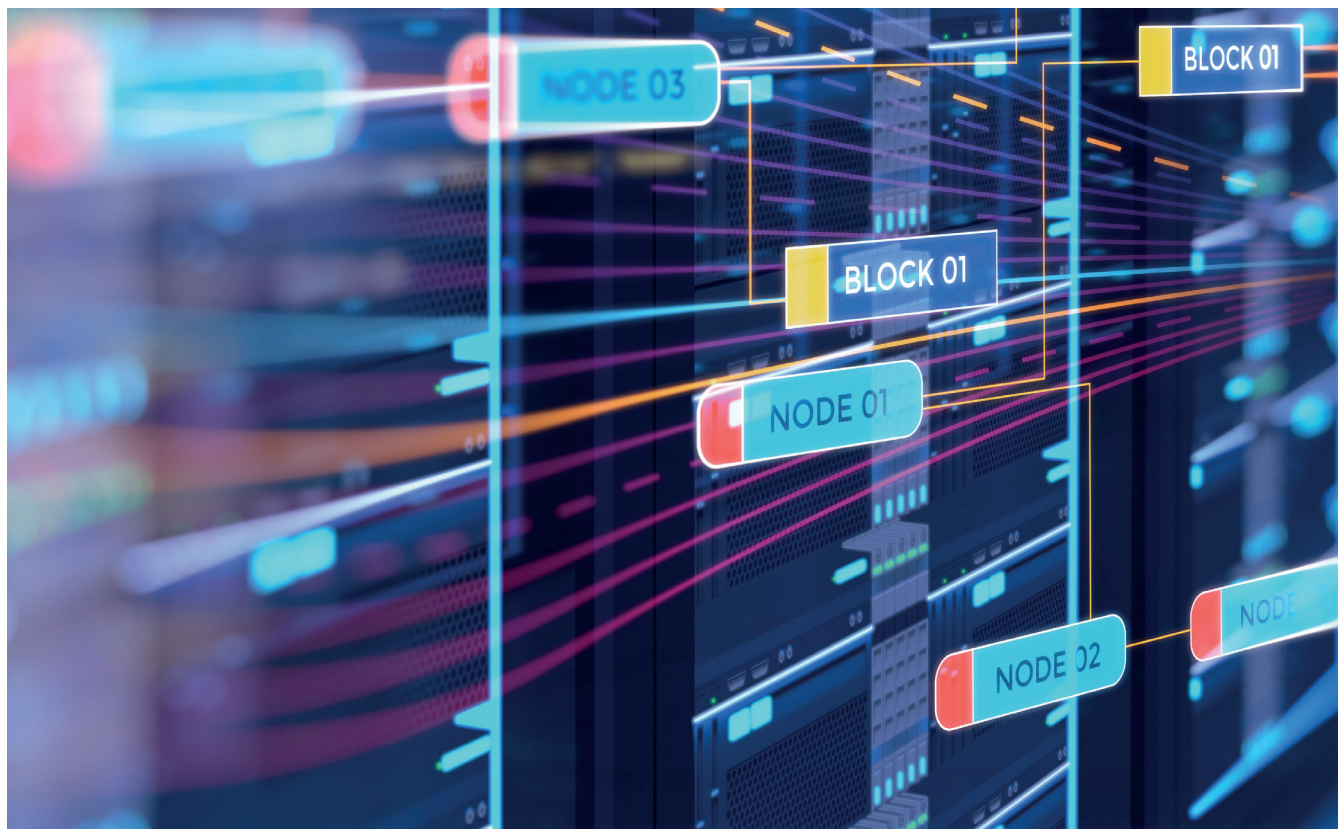
United Kingdom:

El Hassane Ferdaous | el.h.ferdaous@pwc.com

United States:

Jeremy Whitmer | jeremy.whitmer@pwc.com





© 2019 PwC. All rights reserved. PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details.