SOURCES

1. Gartner Magic Quadrant for Process Mining Platforms (2025)

This report identifies several industries where process mining is delivering measurable value:

Energy and Utilities: Used for real-time insights and streamlined operations.

Manufacturing: Helps achieve ROI quickly through process optimization.

IT Services: Leverages data integration for efficient process mining

2. Forrester's Process Intelligence Landscape

Forrester discusses how process and task mining are converging to provide a more comprehensive view of operations. This is particularly relevant in:

Financial Services

Healthcare

Retail These industries benefit from combining system-level and user-level process insights

2

.

🔗 Read the Forrester blog

Catherine Collins 💡 1

FROM Co-PILOT **1. Healthcare**

Applications: Patient journey analysis, treatment process optimization, resource utilization.

Benefits: Improved patient outcomes, reduced waiting times, better compliance with medical protocols.

2. Manufacturing

Applications: Production line monitoring, quality control, supply chain optimization.

Benefits: Reduced downtime, improved throughput, enhanced product quality.

3. Financial Services

Applications: Loan processing, fraud detection, compliance auditing.

Benefits: Faster transaction times, reduced risk, improved regulatory compliance.

4. Telecommunications

Applications: Customer service workflows, billing processes, network operations.

Benefits: Enhanced customer satisfaction, reduced churn, streamlined operations.

5. Retail and E-commerce

Applications: Order-to-cash processes, inventory management, returns handling.

Benefits: Improved customer experience, optimized logistics, better demand

Catherine Collins

Business Process Outsourcing Sector

Call center software to track engagement

Ticketing systems to provide IT support

Sasanka

- standardized workflows and centralized enterprise systems
- these have more data oriented practices (invoices, schedules)
- used for compliance monitoring, efficiency tracking, and bottleneck elimination

Sasanka

Future directions. Gartner, Inc. is a prominent American research and advisory firm that specializes in providing insights, tools, and consulting services to business and technology leaders across various industries. Gartner sees five directions in which the process mining platform market will evolve.

1. Infusion of AI, GenAI and ML. Innovators and leaders in this market will focus on a mix of AI, ML and GenAI capabilities that generate real business value.
2. Market Consolidation and Acquisitions, Smaller vendors will not last long. Yet there will be some Specialized/Focused Solutions for niche markets.

3.Object-Centric Process Mining. One of the major trends in process mining will be object-centric process mining. OCPM shifts focus from single-case analysis to a multiobject perspective, enabling enterprises to track various entities like customers, products, or services and their interactions within processes.

4. Business Operations Intelligence or Operational Intelligence. This platform will provide a dynamic model of any organization that relies on operational or other data. It will enable the organization to understand how the organization operationalizes its business model, connects with its current state, responds to changes, deploys resources and delivers expected customer value.

Catherine Collins

References for other industries

Healthcare focused on collaborative learning, continuous improvement, and patient-centered care:

1Samara, M. N., & Harry, K. D. (2025). Leveraging Kaizen with process mining in healthcare settings: A conceptual framework for data-driven continuous improvement. *Healthcare, 13*(8), 941. https://doi.org/10.3390/healthcare13080941

Arias, M., Rojas, E., Aguirre, S., Cornejo, F., Munoz-Gama, J., Sepúlveda, M., & Capurro, D. (2020). Mapping the patient's journey in healthcare through process mining. *International Journal of Environmental Research and Public Health, 17*(18), 6586. https://doi.org/10.3390/ijerph17186586

Martin, N., Wittig, N., & Munoz-Gama, J. (2022). Using process mining in healthcare. In W. M. P. van der Aalst & J. Carmona (Eds.), *Process Mining Handbook* (pp. 416–444). Springer. https://doi.org/10.1007/978-3-031-08848-3_14

Manufacturing

Stefanovic, D., Dakic, D., Stevanov, B., & Lolic, T. (2020). Process mining in manufacturing: Goals, techniques and applications. In *Advances in Production Management Systems. The Path to Digital Transformation and Innovation of Production Management Systems* (pp. 54–62). Springer. https://doi.org/10.1007/978-3-030-57993-7_7[1](https://link.springer.com/chapter/10.1007/978-3-030-57993-7_7)

Applications in this context: Assembly Line Optimization, Quality Control, maintainence scheduling, production planning, employee training.

High risk industries often track process related data more efficiently such as medicine. Often the means of this is case noting and human entry though

Gavin Crump

Challenging comparing AEC to other industries that are product based versus service based in nature. We need to be careful here

Gavin Crump

The core business service is design and delivery. Software is a means to an end, vs the end in itself like programming industries

Gavin Crump

Professional identity (art, craft etc)

Catherine Collins

It's a profession that is notoriously conservative when it comes to the business and practice side. Profit margins are typically low and time pressures are high. It leads to status quo bias. When something works, there's reluctance to change when it requires the investment of time and money (which there's not a lot of). Even when change is necessary or inevitable, the pressures mean that when push comes to shove when deadlines loom they will revert to tried and true, rather than something that might have benefits in the long run. As Gavin notes, Sunk Costs are a big part of this, as is Loss Aversion.

The profession is not good at R&D, or monetising the value they might bring through their knowledge, all of which might assist in taking advantage of digital innovation.

There's also an aspect that relates to identity. There's a tendency for the profession to see themselves as unique, and with that comes an aversion to trying new things as well as accepting what works in other professions will work in the AEC space.

Michael Lewarne

Architectural design processes are most of the time iterative and unpredictable

Shiva

Architectural design processes involve ideation, various decision making and even complex human interactions

Shiva

The AEC industry has been most of the time slow to adopt new technologies and methodologies, often due to a conservative approach and resistance to change. Many stakeholders may be hesitant to accept new approaches

- hard to utilize process mining "in any tangible way" for designing, as it includes a conceptual aspects to it.
Drafting is the tangible part.
- Relying on different forms of communication for revisions and changes (meeting minutes, email). It will not be a recurring impact. Depends on the context.
- Outcome oriented approach of the traditional construction management.
- Fragmented Data and Siloed Systems

Sasanka

Most people don't know how to code, just have lofty ideas. High dependence on the few that do

Gavin Crump

Sunk cost fallacy

Gavin Crump

Projects take first fiddle, systems come later

Gavin Crump

Gut instinct is still king in AEC

Gavin Crump

People do not want to be tracked sometimes. In some cases because they know they are not efficient, in others because they know people will misuse the data to make assumptions about them

Gavin Crump

Limited interoperability between programs and systems

Gavin Crump

High dependence on web and endpoint for data harvesting. Most smaller firms have no web developer or budget

Gavin Crump

Limited digital resource skills, many of them just learn Revit and don't know how to manage data outside this ecosystem

Gavin Crump

Interaction patterns between different roles (between members, technical vs managerial role)

What occurs outside digital environment being monitored (meetings, feedback from managers & clients etc)

Catherine Collins

It might be helpful to create some boundaries and limits in order to help define what data is needed. Understanding what you're trying to achieve can assist in creating these limits or boundaries.

What's the problem the profession wants solved?

Michael Lewarne

Identifying the typology of the buildings and different variation of each type

Shiva

-Start Time and End Time of the task
-Resource: who is doing the task (individual or teams)?

Shiva

Identifying the activity type and phase that is going to be tracked (for example if the data is from the concept design stage and ...)

Shiva

Opportunities for training, which resources get used the most

Gavin Crump

Which people work well together

Gavin Crump

Checking how complete the work is currently vs forecasted

Gavin Crump

Time spent on project work = billable hours

Gavin Crump

Leaders/teams where morale and performance is suffering

Gavin Crump

Hardware issues or faults

Gavin Crump

How are models the performing

Gavin Crump

User productivity and uptime

Gavin Crump

Are we getting use/value from our software

Gavin Crump

Security issues such as unapproved software

Gavin Crump


Information that is documented for the content of the website of each organisation
Shiva
PAX-ray data
Key strokes
App/window movements
Dwell time in apps
Gavin Crump
Resourcing systems, projections and allocations
Gavin Crump
Code production
Gavin Crump
Written/reported documents such as bids, briefs, proposals
Gavin Crump
Cloud model sharing environments such as ACC
Gavin Crump
Teams interactions, groups, reactions
Gavin Crump
Journals from software such as Revit and Rhino
Gavin Crump
Financial systems
Gavin Crump
Interactions with custom GPT's, agentic systems etc.
Gavin Crump
HR databases and systems
Gavin Crump
Clash tracking, reporting for models
Gavin Crump
OPS systems such as Deltek
Gavin Crump
Meetings and appointments via teams/email
Gavin Crump
Can we mine paxray data in different ways, e.g. events over time, frequency of user events by app etc.
Gavin Crump
Supplier data and information, CRM's
Gavin Crump
Contracts, JD's, skills matrices
Gavin Crump
Wikis, guides, Sharepoint etc.
Gavin Crump
Custom mined data via API facing add-ins
Gavin Crump
Common data environments like Aconex (although often the client owns this)
Gavin Crump
Emails
Gavin Crump

Much discussion on how roles/jobs will be taken over by AI. And if that is part of the goals, the discussion becomes about finding revised role for humans

Catherine Collins

Sunk costs
Loss aversion.

Michael Lewarne

Cost

Shiva

Fragmentation of tools

Shiva

- misconception that process mining is a form of surveillance
- unclear ROI for stakeholders

Sasanka

Lack of knowledge and skill

Shiva

Non-repetitive and complex workflows

Shiva

Lack of structured data

Shiva

Complex or nonnegotiable confidentiality barriers

Gavin Crump

Lack of predefined standards or ways this is best done

Gavin Crump

Complex technology stacks, low interoperability

Gavin Crump

Lack of trust from the motivations behind collection of data

Gavin Crump

Security risks and extra steps needed to ensure security

Gavin Crump

Overhead cost and time to setup/maintain

Gavin Crump

Not how companies have been used to working until recently

Gavin Crump

False positives, or things we can't easily identify with quantity alone

Gavin Crump

Low software capability with key decision makers (e.g. prefer Excel over Power BI)

Gavin Crump

Senior business leaders don't always see the value until clients demand it, because a competitor did it for them

Gavin Crump

Architects resisting being reduced to a computer

Gavin Crump

Pilots, demonstrate that concerns (monitoring etc) can be overcome, whilst showcasing the benefits

Catherine Collins

Best Practice guidelines implement them and track/ monitor performance against specific KPIs

Sabrina

What are we trying to achieve?
What's this for?
If we can narrow down what this might be, then maybe we can get closer to answering the question.

There's complexities to the workflows moving from analogue to digital in architecture that are challenging.

Where's the tension in this for the profession? What is the "burning platform" in marketing terms. The problem they need to be solved? Not the one we think they need solved.

Michael Lewarne

Start with small-scale projects in firms that they are not using "process mining" to demonstrate the value and build a case for large-scale projects

Extracurricular training internal expertise in process mining and data analytics among employees to improve a data-driven culture

Many large firms are already building inhouse systems (see right)

Gavin Crump

Many core applications produce journals such as Revit/Rhino can be progressively or retroactively 'scraped' for data. It's not human friendly, needs to be parsed/processed

Gavin Crump

JSON/GEOJSON data dumping, harvesting and conoslidation in web DB is common

Gavin Crump

Forecasting and feedback from finance systems is common, e.g. Deltek to Power BI

Gavin Crump

Some third party tools out there such as BIM Beats

Gavin Crump


Google Earth
Shiva
ClimateStudio
Shiva
Anny external site analysis apps
Shiva
Archicad
Shiva
InDesign
Shiva
Illustrator
Shiva
Photoshop
Shiva
Tools for creating diagrams and editing
Shiva
Climate Consultant
Shiva
DesignBuilder
Shiva
Any external energy optimisation apps
Shiva
Portfolio & Graphic Team
Twinmotion
Shiva
Enscape
Shiva
Rendering Tools
Shiva
Computer performance itself (hardware, net speeds)
Gavin Crump
Miro
Gavin Crump
Aconex
Gavin Crump
Add-ins (third party, inhouse)
Gavin Crump
Revit
Gavin Crump
AI tool use
Gavin Crump
MS Office
Gavin Crump
Outlook
Gavin Crump
Rhino
Gavin Crump
General use/buy-in of new apps
Gavin Crump
Web browser
Gavin Crump
Teams
Gavin Crump
Grasshopper
Gavin Crump

Because architecture has several stages, I think it should be clear in which area exactly the data is to be collected: concept design or design of the technical and functional parts of the building, where we are not very free to make decisions, or when we want to optimize the execution of the projects simply by know this. therefore

it seems that the design phase is more important than the conversation and engineering

Shiva

Project billable vs nonbillable time proportion

Gavin Crump

Errors, warnings and crashes

Gavin Crump

Use of custom tools in the firm to justify ROI

Gavin Crump

Efficiency in production platforms

Gavin Crump

Concentration of platform use across teams as projects progress

Gavin Crump

Trends over time

Gavin Crump

Who likes/commonly works with each other, efficient teams

Gavin Crump

Bad/wrong practices, opportunities for education

Gavin Crump

Data we can use to better estimate/prepare bid plans

Gavin Crump

Progress towards required deliverables

Gavin Crump

Downtime e.g. opening, syncing, saving, exporting, importing

Gavin Crump













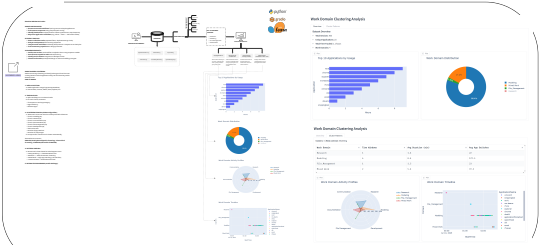
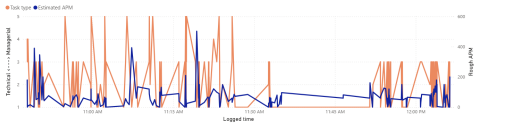
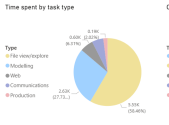
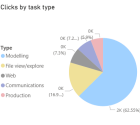
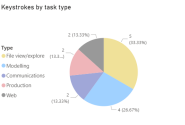







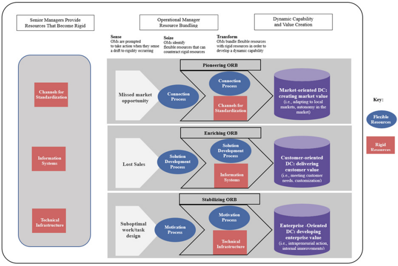
Figure 1 below is the operational resource orchestration / bundling process. ie how do senior and frontline managers work together to achieve value creation and competitive advantage for the firm. Bouncing from Gavin's comment, process mining seems to be low hanging fruit, it is about improving the enterprise, important but not where value and large $ achieved. Rather how we shift value creation for customers and the market is more critical. And so in addition to how process mining can assist with the enterprise (how people use Revit and various software), can we lift the conversation to a higher level. Looking at this model, for example, how can process mining assist change information systems?

Catherine Collins

Paxray enables a deep & thorough understanding of technical software / infrastructure (Revit etc). For those insights to be harnessed, we also need the same depth in understanding of how to motivate employees engaging in those tasks. This is why it is advocated that this human interaction data needs to be captured and analysed. See the suggestions below (network analyses, diary study, linkage analysis). In combination, this information - technical & motivation - will help to create more value for the entreprise.

HOWEVER.... it focuses on more incremental value add. There may be other channels to create higher-order value ie finding different ways to deliver value to customers and more broadly markets; this is the middle an upper rws in Figure 1 below)

Figure 1
Operational Resource Bundling (ORB): A Process to Create Dynamic Capabilities That Counteract Organizational Rigidity



Catherine Collins

What would be measured?
The 'work design' via the SMART model: s = stimulating ('My job provides me with opportunities to learn new things), m = mastery ('My job allows me to use my skills and strengths effectively), a = agency ('I have control over how I complete my work tasks), r = relational ('I have opportunities to collaborate with others in my role'), T = tolerable ('The demands of my job are manageable and reasonable').

Catherine Collins

Employees fears & outcomes from being tracked include:
1. AI and Automation Anxiety A significant number of employees fear that AI and monitoring technologies could make their roles obsolete.
2. Mental Health Impact
Workers who fear job loss due to monitoring or AI report higher levels of stress, burnout, and emotional exhaustion .
3. Trust Erosion
Surveillance tends to erode trust between employees and managers, especially when monitoring is used for control or discipline rather than support
4. Privacy Concerns
Many employees worry about **how their data is used**, especially when monitoring extends beyond work tasks (e.g., tracking location or health data)

Do not use Monitoring as a Threat, control or replacement, Employees more likely perform worse & consider quitting

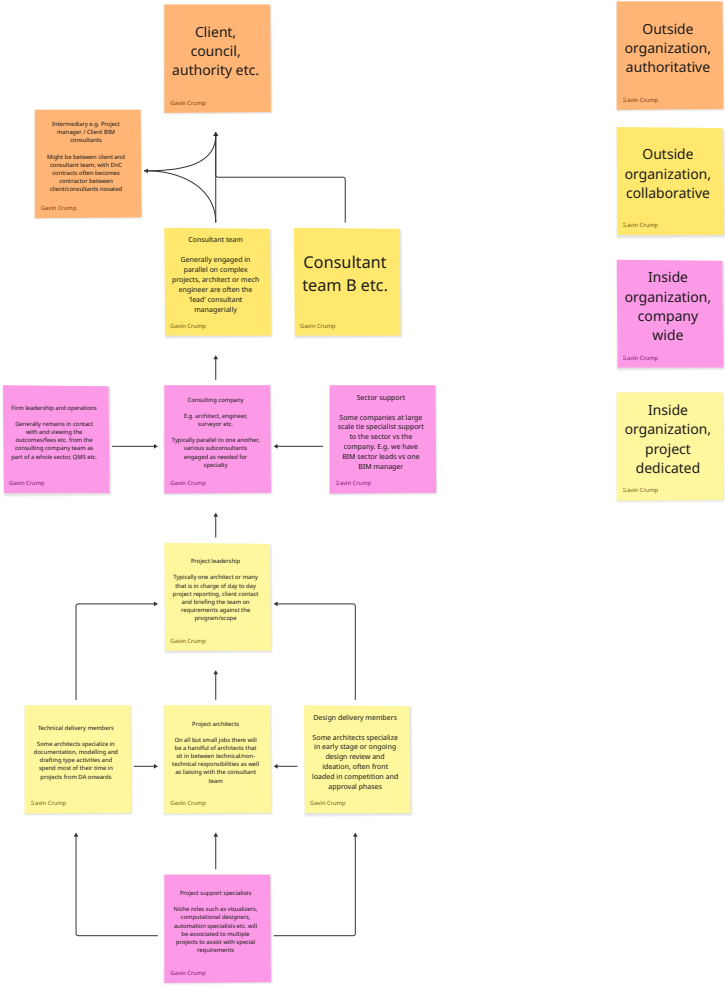
To reduce fear and improve outcomes, research suggests:
Transparent communication about the purpose and limits of monitoring.
Framing technology as supportive, not punitive.
Involving employees in decisions about tech use.
Providing reassurances about job security and retraining opportunities.

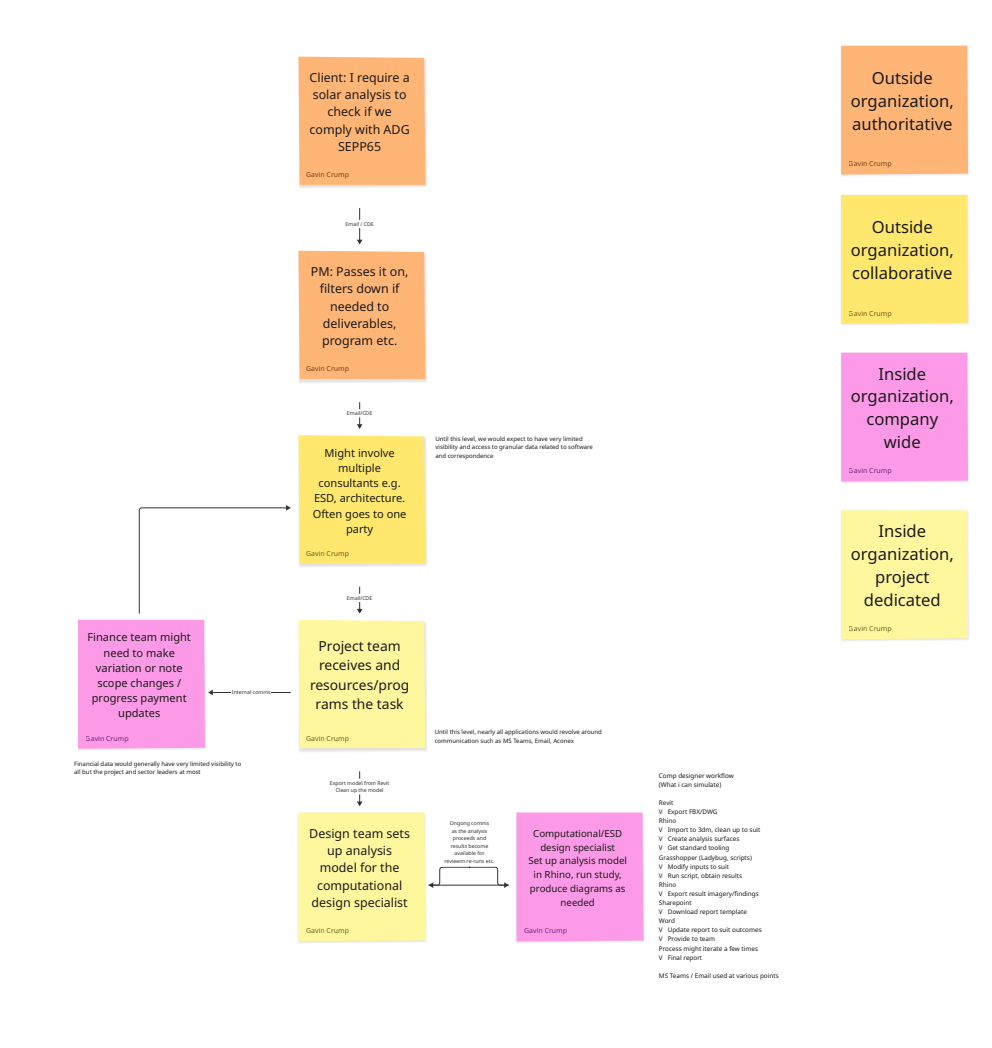
Does it change architect career pathways to be more distinctive: (1) more computational design, or (2) client focused (identifying / persuading value add, cutting through the 'lets just do best practice')

Catherine Collins

Allocating resposibilities according to the identified tasks (who has the best qualifications/skills to handle this task?)

Sasanka


Client, council, authority etc.
Gavin Crump
Intermediary e.g. Project manager / Client BIM consultants
Might be between client and consultant team, with DnC contracts often becomes contractor between client/consultants novated
Gavin Crump
Consultant team
Generally engaged in parallel on complex projects, architect or mech engineer are often the 'lead' consultant managerially
Gavin Crump
Consultant team B etc.
Gavin Crump
Firm leadership and operations
Generally remains in contact with and viewing the outcomes/fees etc. from the consulting company team as part of a whole sector QMS etc.
Gavin Crump
Consulting company
E.g. architect, engineer, surveyor etc.
Typically parallel to one another, various subconsultants engaged as needed for speciality
Gavin Crump
Sector support
Some companies at large scale tie specialist support to the sector vs the company. E.g. we have BIM sector leads vs one BIM manager
Gavin Crump
Project leadership
Typically one architect or many that is in charge of day to day project reporting, client contact and briefing the team on requirements against the program/scope
Gavin Crump
Technical delivery members
Some architects specialize in documentation, modelling and drafting type activities and spend most of their time in projects from DA onwards
Gavin Crump
Project architects
On all but small jobs there will be a handful of architects that sit in between technical/non-technical responsibilities as well as liaising with the consultant team
Gavin Crump
Design delivery members
Some architects specialize in early stage or ongoing design review and ideation, often front loaded in competition and approval phases
Gavin Crump
Project support specialists
Niche roles such as visualizers, computational designers, automation specialists etc. will be associated to multiple projects to assist with special requirements
Gavin Crump
Outside organization, authoritative
Gavin Crump
Outside organization, collaborative
Gavin Crump
Inside organization, company wide
Gavin Crump
Inside organization, project dedicated
Gavin Crump


Client: I require a solar analysis to check if we comply with ADG SEPP65
Gavin Crump
Email / CDE
PM: Passes it on, filters down if needed to deliverables, program etc.
Gavin Crump
Email/CDE
Might involve multiple consultants e.g. ESD, architecture. Often goes to one party
Gavin Crump
Until this level, we would expect to have very limited visibility and access to granular data related to software and correspondence
Email/CDE
Project team receives and resources/programs the task
Gavin Crump
Until this level, nearly all applications would revolve around communication such as MS Teams, Email, Aconex
Internal comms
Finance team might need to make variation or note scope changes / progress payment updates
Gavin Crump
Financial data would generally have very limited visibility to all but the project and sector leaders at most
Export model from Revit
Clean up the model
Design team sets up analysis model for the computational design specialist
Gavin Crump
Ongoing comms as the analysis proceeds and results become available for reviewsm re-runs etc.
Computational/ESD design specialist
Set up analysis model in Rhino, run study, produce diagrams as needed
Gavin Crump
Comp designer workflow
(What i can simulate)
Revit
V Export FBX/DWG
Rhino
V Import to 3dm, clean up to suit
V Create analysis surfaces
V Get standard tooling
Grasshopper (Ladybug, scripts)
V Modify inputs to suit
V Run script, obtain results
Rhino
V Export result imagery/findings
Sharepoint
V Download report template
Word
V Update report to suit outcomes
V Provide to team
Process might iterate a few times
V Final report
MS Teams / Email used at various points
Outside organization, authoritative
Gavin Crump
Outside organization, collaborative
Gavin Crump
Inside organization, company wide
Gavin Crump
Inside organization, project dedicated
Gavin Crump

Opening Revit, doing some work, syncing and closing. When we do capture pauses/app switches

Gavin Crump

A C#/Revit debugging session involving a coder interfacing with ChatGPT for assistance

Gavin Crump

One of our meetings, where a team member is working but in the meeting anyway, maybe doing a task that keeps them semi-occupied

Gavin Crump

Two users passing elements back/forth in Revit due to ownership challenges

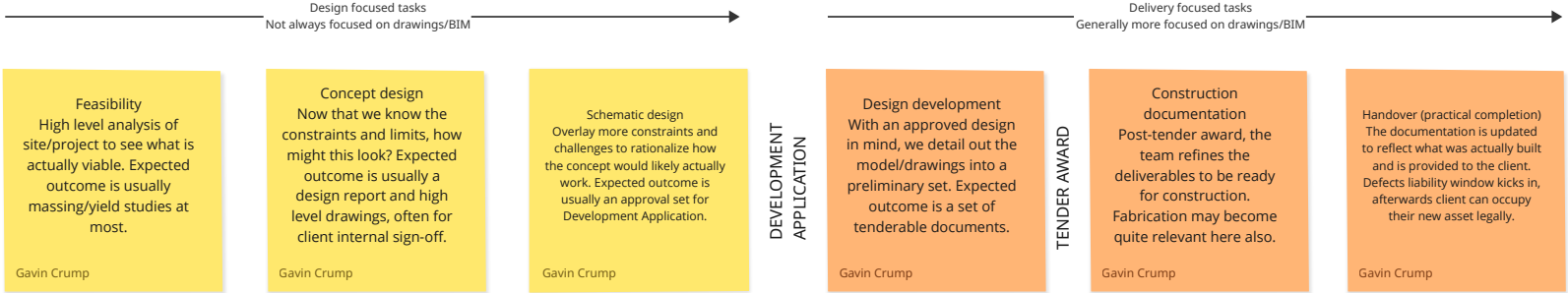
Gavin Crump

A manager pivoting a design concept for a computational designer every 5 minutes or so

Gavin Crump

Any of the above, but with regular MS Teams / email interruptions that the user must attend to immediately and put tasks on hold

Gavin Crump


Design focused tasks
Not always focused on drawings/BIM
Delivery focused tasks
Generally more focused on drawings/BIM
Feasibility
High level analysis of site/project to see what is actually viable. Expected outcome is usually massing/yield studies at most.
Gavin Crump
Concept design
Now that we know the constraints and limits, how might this look? Expected outcome is usually a design report and high level drawings, often for client internal sign-off.
Gavin Crump
Schematic design
Overlay more constraints and challenges to rationalize how the concept would likely actually work. Expected outcome is usually an approval set for Development Application.
Gavin Crump
DEVELOPMENT APPLICATION
Design development
With an approved design in mind, we detail out the model/drawings into a preliminary set. Expected outcome is a set of tenderable documents.
Gavin Crump
TENDER AWARD
Construction documentation
Post-tender award, the team refines the deliverables to be ready for construction. Fabrication may become quite relevant here also.
Gavin Crump
Handover (practical completion)
The documentation is updated to reflect what was actually built and is provided to the client. Defects liability window kicks in, afterwards client can occupy their new asset legally.
Gavin Crump

1. Network analysis

interventions have long focused on formal organizational structures, providing assistance to members who formally work with or report to one another. Yet informal organizational structures or networks are vital for the flow of knowledge for organizational functioning. Networks are often taken as a given within an organization, seen as flat, egalitarian spaces where everyone is connected and benefits equally. Yet networks can be disconnected, bottlenecked, distribute incomplete knowledge and misinformation (e.g., gossip), and stifle diversity of thinking and opportunity. Social Network Analysis (SNA) can help make visible these unseen informal work connections and identify collaboration substructures that possess knowledge transfer strengths and vulnerabilities (Borgatti and Halgin, 2011). Whilst teams research with SNA exists, the focus has been on understanding antecedents of team effectiveness. There has been a suggestion that SNA might provide a 'map' to be utilized as a workflow diagram to improve team effectiveness (Park, Grosser, Roebuck & Mathieu, 2020).

Park, S., Mathieu, J. E., & Grosser, T. J. (2020). A network conceptualization of team conflict. *Academy of Management Review*, *45*(2), 352-375. https://doi.org/10.5465/amr.2016.0472

Catherine Collins

2. Diary study.

Imagine you're part of a study where researchers want to understand how your mood affects your productivity at work. Instead of just asking you once, they give you a simple journal or app and ask you to jot down a few things every day—like how you felt, what tasks you did, and how well you think you performed. This goes on for a few weeks.
By collecting these daily entries, researchers can see patterns over time.
It captures **real-time experiences**, not just memories.
It helps understand **daily fluctuations** in things like work tasks, employee engagement and performance.
It's great for studying **cause-and-effect** relationships. eg amount / type of coding -> characteristics of work (ie how stimulating and variety the work has) -> employee engagement & performance

What would be measured?
The 'work design' via the SMART model: s = stimulating (*My job provides me with opportunities to learn new things)*, m = mastery ("*My job allows me to use my skills and strengths effectively)*, a = agency ("*I have control over how I complete my work tasks)*, r = relational ("*I have opportunities to collaborate with others in my role."*), T = tolerable (*The demands of my job are manageable and reasonable."*).

3. Linkage analysis

This type of study links different data souces that are rich in information about workplace interactions and/or performance outcomes. Data is extracted and when in quantitative form (eg all those dashboard statistics from the 'day in the life of an architect' , advanced statistical methods help extra cause and effect between the variables.

Example: Yang, L., Holtz, D., Jaffe, S., Suri, S., Sinha, S., Weston, J., ... & Teevan, J. (2022). The effects of remote work on collaboration among information workers. *Nature human behaviour*, *6*(1), 43-54.

Abstract. The coronavirus disease 2019 (COVID-19) pandemic caused a rapid shift to full-time remote work for many information workers. Viewing this shift as a natural experiment in which some workers were already working remotely before the pandemic enables us to separate the effects of firm-wide remote work from other pandemic-related confounding factors. Here, we use rich data on the emails, calendars, instant messages, video/audio calls and workweek hours of 61,182 US Microsoft employees over the first six months of 2020 to estimate the causal effects of firm-wide remote work on collaboration and communication. Our results show that firm-wide remote work caused the collaboration network of workers to become more static and siloed, with fewer bridges between disparate parts. Furthermore, there was a decrease in synchronous communication and an increase in asynchronous communication. Together, these effects may make it harder for employees to acquire and share new information across the network.

Catherine Collins

Employees fears & outcomes from being tracked include:
1. AI and Automation Anxiety A significant number of employees fear that AI and monitoring technologies could make their roles obsolete.
2. Mental Health Impact
Workers who fear job loss due to monitoring or AI report higher levels of stress, burnout, and emotional exhaustion .
3. Trust Erosion
Surveillance tends to erode trust between employees and managers, especially when monitoring is used for control or discipline rather than support
4. **Privacy Concerns**
Many employees worry about **how their data is used**, especially when monitoring extends beyond work tasks (e.g., tracking location or health data)

Do not use Monitoring as a Threat, control or replacement,
Employees more likely perform worse & consider quitting

To reduce fear and improve outcomes, research suggests:
Transparent communication about the purpose and limits of monitoring.
Framing technology as supportive, not punitive.
Involving employees in decisions about tech use.
Providing reassurances about job security and retraining opportunities.

Does it change architect career pathways to be more distinctive: (1) more computational design, or (2) client focused (identifying / persuading value add, cutting through the 'lets just do best practice')

Catherine Collins

Allocating resposibilities according to the identified tasks (who has the best qualifications/skills to handle this task?)

Sasanka

How can Paxray help AEC (through PM & efficiencies)

???

- Can help identify delays in architectural design processes, allowing for timely interventions and resource reallocation — Shiva
- Better understand relationships between platforms — Gavin Crump
- Identify underutilized software in our tech stack — Gavin Crump
- Flag and capture undesirable practices — Gavin Crump
- Identify commonly viewed help resources in the company — Gavin Crump
- Identify broken focus time — Gavin Crump
- Set and measure against project benchmark expectations — Gavin Crump
- Use insights to identify appropriate training — Catherine Collins
- Identify unintended detours - searching for additional resources, tools, intructions https://www.celonis.com/blog/ascend-performance-materials-eliminated-hidden-factory-with-process-mining/ — Sasanka
- Identify manual fixes that are required for already established process — Sasanka
- Implement practices such as "Just in time" with recognised patterns — Sasanka
- Identify granual level tasks that can be assigned to more suitable/capable individuals — Sasanka
- flexible manufacturing – designers could plan for smaller batches and more variety — Sasanka
- providing effective feedback to employees supporting their growth — Sasanka
- recognising more efficient feedback loops for design iterations — Sasanka

The pros of paxray (and PM software as a whole) in AEC

- Extraction of the time that people spend on other activities that would count as a distraction to their main task — Shiva
- Realising which Apps are used the most and comparing their efficiency to achieve a point where the AEC sector uses the least fragmented apps — Shiva
- Estimating the right amount of money that should be paid for providing apps — Shiva
- Runs relatively silently and automatically — Gavin Crump
- Anonymization of data, blacklisting — Gavin Crump
- Tracking user productivity (if done right) — Gavin Crump
- Graphs are relatively easy to understand at face value — Gavin Crump
- reconstruct the actual modeling process — Sasanka
- identify collaboration network thorugh related apps — Sasanka

The cons of paxray (and PM software as a whole) in AEC

- Software bugs for installation and commissioning in existing AEC processes systems — Shiva
- they should give more control to the user regarding the data. So the user can see (1) the data has been synced, (2) the data that's yet to be synced, (3) a timesheet of when paxray was collecting data (in a visual timeline), etc. A GUI app, to controll different aspects of the data collection (by the user) is a plus. — Kyan (💡 1)
- The annoying notification system--for syncing data. — Kyan
- Should a team decide to collect dat a locally, without syncing data to paxray server (for privacy or firm-related regulations), there should be an option to add the servername and key after installation. Even more, some systems might not have internet connection--as everything therein might be done offline. — Kyan
- ability to trouble shoot by the user ?? reddit post — Sasanka
- Lacks ability to gain context of what is happening within an application — Gavin Crump
- Keystrokes and macros are not that often useful to know aside from catching bad ones or repetitive ones — Gavin Crump
- Does Paxray avoid registering sensitive keystrokes like passwords, email text body etc. — Gavin Crump
- AEC uses so much technology, it almost needs whitelisting instead of blacklisting — Gavin Crump (😀 2)
- Not tailored specifically for AEC vs platforms like BIMbeats — Gavin Crump

What's missing from Paxray that AEC needs.

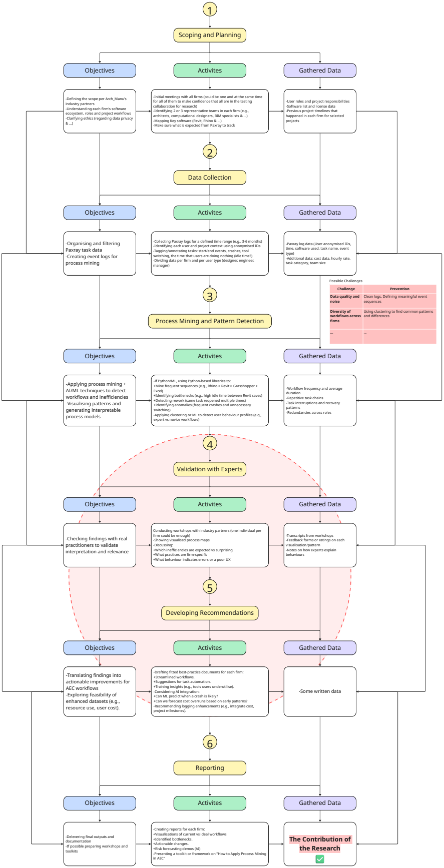
- Can Paxray collect an infinite amount of scattered data from different stages of architectural firms' workflows? — Shiva
- classification of/for the AEC steps inside the software that helps to identify which data related to which phase — Shiva
  - Site analysis
  - Pre-Design
  - Design
  - & ...
- Sync/upload the local .db file (i.e., recorder_log.db), should there be a problem when syncing the dat. * When we start data collection, we cannot afford to lose weeks, or even months, worth of data if the data is not synced. — Kyan
- [based on Gavin's comment] one shortfall of paxray is it looks like it isnt picking up grasshopper in rhino inside. must only register the host application — Kyan
- Ability to mix in external data from other systems, even if it must conform to a schema that paxray supports — Gavin Crump
- Ability to tag patterns, associations as known process' or likely ones. Help clarify to non-tech people what they are looking at in graphs — Gavin Crump
- Tracking hardware states against platform movements — Gavin Crump
- Actions over time versus just aggregated overall — Gavin Crump
- Shot clock where user can give it more context (e.g. what project am I working on) — Gavin Crump
- Making assumptions about time AFK, e.g. in a meeting on outlook calendar — Gavin Crump

Hackathon material

Title	*Making Sense of AEC-related Task/Process Mining Data through AI + Domain-Knowledge*
Problem Description	***• Problem(s)*** *In the Architecture, Engineering, and Construction (AEC) sector, inefficiencies in software workflows can scale upward—negatively affecting budget estimations, workforce planning, and project timelines. While process mining (PM) has driven major improvements in other industries, AEC has yet to fully leverage its potential.* ***• Data*** *The dataset, already collected and provided by industry partner PaxRay GmbH, comprises approximately six million records. It originates from the routine workflows of two computational designers and academic researchers. The data spans multiple software platforms commonly used in the AEC sector, including Rhino, Revit, and Photoshop.* *This project focuses not on collecting new data, but on analysing an already available, large-scale dataset—through the lenses of AI and domain expertise—to uncover actionable insights about how software is being used in practice.* ***• Goal(s)*** *The primary goal is to interpret and analyse this pre-collected data to:* *- identify the most frequent workflows and performance bottlenecks;* *- detect patterns of inefficiency, such as repeated tasks, recovery behaviour after crashes, and redundant processes across teams;* *- evaluate the feasibility of integrating additional data layers (e.g., resource allocation, cost, user's hourly rate, etc.) to forecast risks, impact, or inefficiencies in real-world project contexts.*
Intended outcomes / deliverables	*1. Apply a combination of PM and AI techniques to mine and visualise task/process patterns.* *2. Validate patterns through input from domain experts, ensuring findings are relevant and actionable.* *3. Recommend best practices to address inefficiencies or bottlenecks in digital workflows.* *4. Explore and document limitations, considerations, and opportunities for applying PM in AEC—particularly as it relates to tracking resource waste, downtime, or team redundancies.*
Dependencies	*Success depends heavily on the inclusion of domain experts familiar with architectural workflows and tools. While technical knowledge is helpful, the key asset will be participants' ability to interpret processes in context.*
Proposed team size	A team of six is proposed, ideally including at least one participant from each industry partner, to ensure diverse perspectives.

Note

Shiva



Possible Challenges

Challenge	Prevention
Data quality and noise	Clean logs, Defining meaningful event sequences
Diversity of workflows across firms	Using clustering to find common patterns and differences
...	...

The PM framework (for ASC context)

Success Stories (from other industries)

Software to track processes

General Purpose software

Domain-Specific

In-house

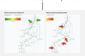
3rd party

1. ARIS Process Mining
2. Celonis
3. Fluxicon
4. IBM Process Mining
5. Minit
6. PAFnow
7. QPR Software
8. Signavio
9. Software AG
10. UiPath

1. ABBYY
2. Automation Anywhere
3. Blue Prism
4. Nintex
5. Roboyo
6. UiPath
7. ultimate.suite
8. WorkFusion

How to Augment the generl-purpose PM data with that of domain-specific tools.

Best case vs Worst case (for task/process mining)



How to tacke data privacy & Sensitivity

Use Paxray features (e.g., Blacklisting)

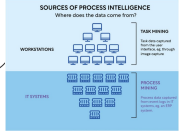
Use Gavin and Hesham Comments (MS Teams)

www.celonis.com

Process Intelligence and Process Mining | Celonis

The Celonis Process Intelligence Platform - powered by process mining and AI - let's you optimize your processes and maximize ROI from your AI deployments. Get started quickly and scale infinitely.

Process Mining vs Task Mining



www.workscope.com

Workscope.com

Businesses today are constantly seeking new ways to optimise their operations, improve internal processes and identify areas for process automation. With the growing number of applications used in modern organisations, understanding how tools are used h...

Future Work (after Hackathon)

(Agentic) AI + PM

Robot Process Analysis
(+ Computer Vision)

Limitations

Limitations

To Busy to find the culprit in our processes