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PASA Digital Admin Working Group

Produced in partnership with:



PASA Experts for Digital Admin

Jargon Buster Reference Guide V2 – Focus on Generative AI &
Large Language Models (LLMs)

December 2023

Digital Administration Jargon Buster Update

Section	Content	Page
1	Introduction	1
2	Large Language Models (LLMs), AI, Machine Learning (ML), Chatbots & NLP	3
3	Digitisation vs Digitalisation	12
4	Data Storage including Cloud	12
5	Application Programming Interface (API)	13
6	Information Security & Digital Identity Verification	15
7	User Experience & User Interface	18
8	Open Banking & Open Finance	19
9	Skills	20
10	Project Methodology (Agile vs Waterfall) & System Development Lifecycle (Development vs UAT vs Penetration Testing)	22
11	Conclusion	24

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1. Introduction

In September 2021, we published our initial jargon buster which included several key technology terms and their relevance to pensions.

AI has been around for decades, but in November 2022, OpenAI released ChatGPT (Chat Generative Pre-trained Transformer) and within a week of its launch, this innovative AI-powered chatbot, had one million users. Since November 2022, ChatGPT has grown to over 100 million users. It's the fastest growing app and this speed of adoption has never been seen before.

In this paper we'll cover a number of new terms explaining what has led to the major technological advancement from early AI to Generative AI today and include examples where these tools can be used to enhance productivity together with some of the risks that should be considered. The definitions have been updated with the assistance of ChatGPT.



Big Data
(Training)



Algorithmic
Advancements
(Deep Learning)



Computational Power
(Neural Networks)



Hardware Advances
(GPUs)



Research &
Collaboration
(Open Source)

Microsoft invested in OpenAI in 2019 and in Q4 2023 released Copilot¹ - an AI-powered tool revolutionising the way millions of people work and communicate using Microsoft 365 apps. Copilot is integrated in the apps we all use every day, (MS Word, Excel, PowerPoint, Outlook etc) and will help us stay in the flow of work, freeing us up to focus more on the task at hand and less on the busy work. Copilot in Word writes, edits, summarises and creates right alongside people as they work. Microsoft also owns GitHub - a collaboration-based software development tool. GitHub Copilot X enhances the current software development capabilities using AI and makes the software development process more efficient.

When Copilot was announced, Microsoft CEO, Satya Nadella stated



Today marks the next major step in the evolution of how we interact with computing, which will fundamentally change the way we work and unlock a new wave of productivity growth

¹ Currently you need to buy 300 licences to be able to use Copilot

At London Tech Week in June 2023, the discussions focused on how AI will augment and elevate our capabilities and put the human at the centre. Recognising the potential risks, the first Global AI summit was held at Bletchley Park in the UK in November 2023. This major gathering brought together governments, leading AI firms and experts to discuss how the risks of AI can be mitigated through internationally coordinated action².

² The US issued an Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence (30 October 2023) - <https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/> and the EU AI Act was issued on 9 December 2023 - <https://artificialintelligenceact.eu/developments/>

2. Large Language Models (LLMs), AI (Artificial Intelligence), Machine Learning (ML), Chatbots and NLP (Natural Language Processing)

Why's it relevant to pensions?

Generative AI is going to change the way we work and there are numerous benefits that can be realised in pensions. To utilise these new tools, data must be of a good quality. LLMs, ChatGPT, and AI can enhance customer support, simplify administrative processes, provide personalised information, simplify and improve communications and increase awareness and understanding of UK pensions. It's important to note implementing these technologies should prioritise data privacy, security, and compliance with regulatory frameworks to protect individuals' sensitive pension information.

Use Cases:



COMMUNICATION

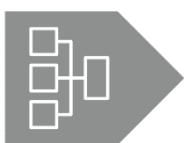
Saver Communication:

Pension-related information can be complex and overwhelming for many people. Generative AI can simplify and clarify pension-related concepts, jargon, and processes by providing clear explanations in plain language



USER SUPPORT

LLMs like ChatGPT can provide personalised and automated customer support



PROCESS SIMPLIFICATION

Pension Calculators/Modellers:

LLMs can be used in modellers to help individuals understand their projected pension income based on various factors like current contributions, expected salary growth, and retirement age

Pension Transfers:

AI systems can assist in facilitating smooth and efficient pension transfers between different providers by automating the process, ensuring accurate data transfer, and minimising administrative delays



NOTIFICATIONS

Pension Notifications:

AI-powered tools can send automated notifications and reminders to individuals, keeping them informed about important pension milestones, contribution deadlines, and changes in pension regulations



EDUCATION

Pension Education and Awareness:

LLMs can generate educational content, interactive guides, and FAQs to improve saver understanding of pension schemes, options, and the importance of long-term retirement planning



PRODUCTIVITY

Productivity enhancements using Microsoft GitHub Copilot and Microsoft 365 Copilot



AUTOMATION

For large schemes with large pensions management teams, rules can be set to direct queries to the relevant team to respond. With large data sets, trends can be predicted based on what has been observed/learned.



IDEA GENERATION

LLMs are very useful in producing initial drafts of documents and summarising large volumes of content



FAQ

Working with experts in the field of natural language processing (NLP) and chatbots, frequently asked questions can be automated to allow pension administrators to focus on more complex queries



DIGITAL IDENTITY

Digital identity products have been known to use AI algorithms to validate official documents like passports and driver's licenses to ensure the authenticity of an identity. AI models analyse transaction patterns to identify and halt fraudulent activities, often requiring additional verification steps when suspicious activity is detected



GOVERNANCE

AI powered platforms can empower trustee boards with tools to improve Board efficiency

Risk Considerations and Mitigations

This technology is evolving at a rapid pace and the regulations have yet to be defined. It's important for all firms to ensure they have the necessary policies and frameworks in place to guarantee the safe use of these new tools.

The IFOA issued a risk alert in September 2023³ with a particular focus on actuaries involved in the development and use of AI techniques and outputs.

Some items to consider are listed below.



- Establish clear ethical guidelines for the use of AI technologies
- Implement strategies to identify and reduce biases in AI models and outputs

ETHICAL USE & BIAS MITIGATION



DATA MANAGEMENT & PRIVACY

- Data Privacy - Ensure adherence to data protection regulations (e.g., GDPR). Ensure policies are in place to protect any personal data used and anonymise data where possible
 - Data Quality - Ensure the data used to train and validate models is accurate and representative
-



AI & DATA SECURITY

- Data Security - Establish robust data security protocols to prevent unauthorized access or breaches.
 - Protect AI systems against adversarial attacks and ensure the integrity of generated outputs
-



TRANSPARENCY & EXPLAINABILITY

- Ensure AI systems provide clear, understandable explanations for their predictions and decisions.
 - Include requirements for explainable AI where decisions can be clearly interpreted and understood by humans.
 - Develop transparent processes around how AI models are created, validated, and deployed
-

³ [IFOA Risk Alert - Sep 2023](#)



ACCOUNTABILITY & OVERSIGHT

- Clearly define roles and responsibilities for the development, deployment, and management of AI systems and have clear processes to determine accountability if issues arise, and ability to examine AI's decision process
- Implement robust oversight mechanisms, including periodic audits and evaluations of AI systems



COMPLIANCE

- Document how AI applications comply with policies, applicable laws and regulations
- Adhere to industry standards and best practices for AI and machine learning
- Build in auditing capabilities to evaluate AI systems on an ongoing basis for proper functioning, accuracy, fairness, etc



RISK ASSESSMENT

- Require a comprehensive risk assessment for each AI system evaluating potential harms, biases, security vulnerabilities, misuse cases, and plans for mitigation



CONTINUOUS MONITORING & IMPROVEMENT

- Continuously monitor AI systems and have humans able to override incorrect or harmful decisions
- Ensure AI systems can adapt to changing conditions and requirements



DISASTER RECOVERY

- Ensure there's a plan in place to manage failures or issues with AI systems
- Implement backup systems and redundancy plans to manage AI system downtime or failures



USER EXPERIENCE

- Build user trust by ensuring AI systems operate reliably and fairly.
 - Ensure AI technologies are accessible and inclusive to all users
 - Mandate extensive testing on diverse data sets and real-world conditions to validate performance, safety and fairness across different populations
- Document results



COLLABORATION & EXTERNAL MANAGEMENT

- Involve all relevant stakeholders in the development and deployment of AI technologies
- Engage with external experts, communities, and organisations for a more comprehensive and inclusive AI policy

Responsible AI and AI Safety is key

The first Global AI Summit was held in the UK on 01 & 02 November with representatives from 28 countries. One of the key outputs was the Bletchley Declaration on AI safety⁴. Some key terms used include the following:

Large Language Models (LLM)

LLMs are powerful computer programs designed to understand and generate human-like text. They're trained on huge amounts of data and learn the patterns and relationships between words and sentences. These models can be used for various tasks, such as generating text, answering questions, summarising documents, and more.

Red Teaming

Red teaming involves creating a group that acts as an adversarial 'red team' to challenge and probe an AI system for potential flaws, biases, and security vulnerabilities. The red team acts as a devil's advocate, thinking creatively about ways the system could fail or be misused. This allows developers to identify and address issues proactively.

Watermarking

Watermarking in Generative AI refers to embedding a kind of signature or pattern into the AI-generated content that can be used to trace its origins. For example, an AI creating images might include a barely noticeable pattern of pixels indicating the image was machine generated. This is important for authenticity, copyright protection, and to prevent the misuse of AI-generated content. It helps people distinguish between AI-generated and human-created content and deters malicious actors from passing off AI-generated work as their own.

'Evals'

'Evals' is shorthand for evaluations. In GenAI, evaluations are critical for measuring the performance and capabilities of an AI model. This could involve testing the AI's ability to generate accurate and relevant content, checking for biases in outputs, or measuring how well the AI performs on specific tasks compared to benchmarks. Evals might be done through automated metrics, human judgment, or a combination of both, and they're essential for ongoing improvements and ensuring the AI meets the necessary standards of quality and reliability.

Big Data/Training Data

Big data refers to extremely large and complex sets of data. In the context of training LLMs, big data is used to create diverse and comprehensive datasets for model training. Safety, biases and limitations of the training data also need to be carefully addressed.

Tokenisation

Tokenisation is a key process used to prepare text data for training LLMs. The goal of tokenisation is to break down text into smaller units called tokens. Tokens can be individual words, sub-words, characters, or even whole sentences or paragraphs.

⁴ [AI Safety Summit 2023: The Bletchley Declaration](#)

Perplexity

Perplexity is a key metric used to evaluate LLMs. It measures how well an LLM can predict the next token/word in a sequence and evaluates the model's internal representation of language. Lower perplexity indicates the model is better at predicting the next token.

Zero-shot learning

A machine learning scenario where the model makes accurate predictions without having seen any examples during training.

Few-shot learning

A scenario where the model learns information with a very small number of examples.

Prompt Engineer

A Prompt Engineer is someone who constructs and optimises prompts to get the best performance from LLMs. The prompt is the initial text you feed into the LLM to provide context and define the task. Crafting a good prompt is challenging as the LLM relies completely on the prompt to understand the problem. A Prompt Engineer experiments with different ways to frame the prompt using examples, descriptions, formatting, etc. The goal is to guide the LLM to generate the desired output.

Multimodality

LLMs are becoming multimodal, meaning they can process and generate information across multiple modalities like text, images, audio, video, etc. rather than just text.

GPT - (Generative Pre-trained Transformer)

GPT is a type of LLM developed by OpenAI, which includes a transformer designed to process sequential data in parallel.

GPT is a specific type of large language model developed by OpenAI. It stands for 'Generative Pre-trained Transformer'. The 'generative' element refers to the ability to create text, and the 'pre-trained' half refers to the fact it was trained on a huge dataset before being fine-tuned for specific tasks. Transformers are a type of architecture used by GPT models (see below).

Transformers

Transformers are a type of neural network architecture that revolutionized natural language processing (NLP). They're designed to handle sequential data, such as text, more efficiently than previous approaches. Transformers use self-attention mechanisms to capture the relationships between different words in a sentence. This allows them to understand the context and meaning of words in a more comprehensive way.

ChatGPT

ChatGPT is an advanced AI model developed by OpenAI. It's designed specifically for generating conversational responses. Using a large amount of text data, ChatGPT has learned to understand and generate human-like text in a chat-like format. It can be used in various applications, such as customer support, answering questions, and engaging in interactive conversations with users.

AI hallucination

An AI hallucination refers to a situation where an artificial intelligence system, like a computer program or a robot, generates or perceives something that isn't actually there or doesn't exist in reality. It's similar to how a person might experience a hallucination, where they see, hear, or sense things that others cannot.

In the context of AI, hallucinations can occur when the system is trained on a large amount of data and tries to generate new information based on what it's learned. Sometimes, the AI system can make mistakes or produce inaccurate or unrealistic outputs. These mistakes can lead to the generation of strange or nonsensical content that appears as if the AI is perceiving things that aren't really there.

It's important to note AI hallucinations aren't intentional or deliberate actions. They're the result of limitations or errors in the AI system's training or algorithms. Researchers and developers continually work to improve AI systems and reduce the occurrence of hallucinations to make them more reliable and accurate.

It's important to always validate a response.

Google Bard

Google Bard is a LLM developed by Google AI. It's trained on a massive dataset of text and code, and can be used for a variety of tasks, including natural language generation, machine translation, and question answering.

Claude. Ai

Claude.Ai is a LLM developed by an AI start-up Anthropic. It claims to be trained on safer datasets curated by humans and aims to be helpful, harmless and honest.

In summary, large language models like GPT are advanced AI systems using transformer architecture to understand and generate human-like text. They're trained on vast amounts of data and can be utilized for various tasks in NLP.

Artificial Intelligence (AI)

AI refers to the development of computer systems performing tasks typically requiring human intelligence. These tasks can include things like recognising patterns, understanding natural language, making decisions, and solving problems. AI can be implemented in various ways, including machine learning algorithms, deep learning models (like GPT), and other computational techniques.

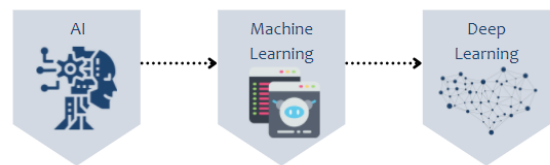


This is achieved through the machine actually ‘learning’, as opposed to simply regurgitating masses of dictionaries, for example. This can be either through a human ‘teaching’ it, such as through the inputting of processes, or, in the ‘purist’ definition of AI, the machine learning for itself.

If you’ve ever used a chatbot then you’ve experienced the start of the AI food chain.

Machine Learning and Deep Learning

Machine Learning (ML) is a subset of AI that reads data, learns from it, and makes informed decisions based on what it’s learnt. It uses algorithms (a process or set of rules to be followed in calculations or other problem-solving operations) to read data, learn from it, and make informed decisions based on what it’s learnt.



Fraud analytics and credit checks use ML, to learn typical behaviour and alert on anomalies.

Deep Learning (DL) structures use algorithms in layers to create an ‘artificial neural network’ which can learn and make intelligent decisions on its own. This type of learning is the most broad and similar to human intelligence.

Chatbots/AI Assistants (e.g. Alexa, Google Home, Siri and Cortana)

Chatbots are computer programmes designed to simulate conversation with human users online. They’re often used in messaging platforms, websites, or mobile apps to interact with users and provide automated responses to their enquiries or requests. They can do simple things like take bank payment details over the phone. Voice recognition software has advanced in recent years. The limit of a chatbot is the responses and questions it’s been programmed to understand, and creating a seamless handoff between the bot and the human when things get complex.



Chatbots can be rule-based, following predefined rules and responses, or they can be powered by AI technologies to understand and generate more natural and dynamic conversations.

AI assistants, also known as virtual assistants, are advanced software programs powered by AI technologies. They’re designed to understand and interact with users through voice commands or text-based interfaces. AI assistants, such as Siri, Google Assistant, or Alexa, can perform a wide range of tasks, such as answering questions, setting reminders, providing recommendations, controlling smart devices, and more. They use natural language processing, machine learning, and other AI techniques to understand user input, retrieve information, and execute tasks. Chatbots are programs having conversations with users, providing automated responses, while AI assistants are more advanced virtual helpers understanding and performing various tasks based on user commands, using AI technologies to provide more interactive and personalised experiences.

A well-designed chatbot can triage savers, signpost to them where to find further information and handle simple tasks, freeing up the administrators for more complex work.

Natural Language Processing (NLP)

NLP is a field of AI focusing on enabling computers to understand, interpret, and interact with human language in a natural and meaningful way. NLP is all about teaching computers to understand and work with human language, just like we do. It involves developing algorithms and techniques allowing computers to read, listen, and comprehend text or speech. NLP enables machines to understand the meaning, context, and nuances of human language, and perform tasks such as text classification, sentiment analysis, language translation, question answering, and text generation.

NLP strives to build machines which understand and respond to text or voice data, responding with text or speech of their own—in much the same way humans do. There's a good chance you've interacted with NLP in the form of voice-operated GPS systems, digital assistants, speech-to-text dictation software, customer service chatbots, and other consumer conveniences. Chatbots use NLP.

Robo-Adviser

A Robo-Adviser is a digital platform or software using algorithms and automation to provide investment advice and portfolio management services.

A Robo-Adviser is like a virtual financial advisor helping people manage their investments. Instead of meeting with a human advisor, you interact with a digital platform or app. It will do most things a human advisor would do. Here's how it works:

- **Questionnaire:** When you start using a Robo-Adviser, you typically answer some questions about your financial goals, risk tolerance, and investment preferences. This helps the Robo-Adviser understand your needs and objectives
- **Automated Recommendations:** Based on your answers, the Robo-Adviser's algorithms analyse your information and generate personalised investment recommendations. These recommendations consider factors like asset allocation, diversification, and risk management
- **Portfolio Creation:** Once you agree to the recommendations, the Robo-Adviser automatically creates a customised investment portfolio for you. It selects a mix of assets, such as stocks, bonds, and other investments, to match your goals and risk profile
- **Automated Management:** The Robo-Adviser continuously monitors your portfolio and adjusts as needed. It automatically rebalances your investments to maintain the desired asset allocation and may also consider tax-efficient strategies
- **Reporting and Insights:** The Robo-Adviser provides you with regular reports and updates on your portfolio's performance. It may offer insights, projections, and educational resources to help you understand your investments better

- **Low Fees:** Robo-Advisers typically have lower fees compared to traditional human advisors since they rely on automation and technology. This makes them more accessible to a wider range of investors.

Overall, a Robo-Adviser simplifies the investment process by providing automated and algorithm-driven advice and management. It aims to offer convenient, cost-effective, and personalised investment services to individuals who may prefer a digital approach to investing. The Robo-advice approach can be a great initial step to collate the information and allow the saver to build their understanding. They should then speak to an adviser to ensure the advice is appropriate for their circumstance.

3. Digitisation vs. Digitalisation

Why's it relevant to Pensions?

The Digital Admin Working Group is providing guidance on Digitalisation as it's the overall adoption of digital technologies and how these technologies change ways of working that will deliver true benefits.

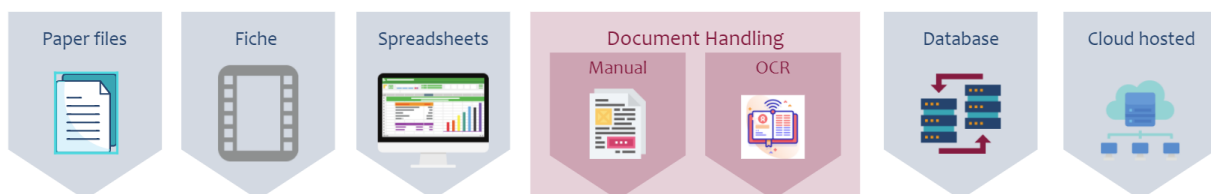
Digitisation refers to the process of converting analogue information into a digital format, for example scanning a document to create a digital copy. It's often the first step to digitalisation.

Digitalisation refers to the adoption of digital technologies to transform business operations, communication, and overall how an organisation works. It's the organisational change associated with applying digital solutions across the business.

4. Data storage including Cloud

Why's it relevant to Pensions?

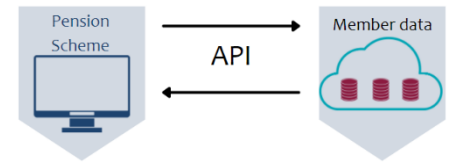
As described in our earlier paper, [e-Admin Journey People and Technology Working Together](#), investing in Data Quality and Storage means you'll have a solid foundation on which to build/improve automated processes.



Cloud-hosted

Pension scheme data used to be hosted on dedicated servers which were effectively electronic filing cabinets. The easiest way to hold data is in online servers. This is often called the 'cloud', but basically the data is still hosted on a bank of remote physical servers.

Some of these cloud hosting services are big names such as Amazon Web Services (AWS) or Microsoft (Azure). They're accessed via the internet connecting the data hosting service to the application wanting to use them.



Types of cloud hosting:

Infrastructure-as-a-service (IaaS): IaaS is a type of cloud hosting where a third-party provider offers virtualised computing resources over the internet. With IaaS, organisations can rent virtual machines, storage, and networking infrastructure on a pay-as-you-go basis. Users have control over the operating systems, applications, and data they deploy on the provided infrastructure. IaaS provides flexibility, scalability, and eliminates the need for organisations to manage physical infrastructure.

Platform-as-a-service (PaaS): PaaS is a cloud hosting model providing an end-to-end platform for clients to leverage scalable software designed around their business needs without worrying about the underlying infrastructure. This typically includes, front end portals, administration and record keeping applications, all necessary databases and infrastructure as well as third-party integrations and security requirements. A PaaS client owns the runtime environment, whilst the vendor runs and maintains it for them. Clients of a PaaS solution benefit from using a fully controlled and tested environment for their users without the need to constantly test and update to new versions of the code as this is managed by the PaaS provider. The concept is much like being a customer of Microsoft 365 where security, compliance and updates are all managed for you.

Software-as-a-service (SaaS): SaaS is a cloud hosting model where applications are provided over the internet as a service. In this model, users access software applications through a web browser or API without the need for local installation or management. The software is centrally hosted and maintained by the service provider, who handles tasks like infrastructure management, security, and software updates. SaaS offers convenience, easy scalability, and reduces the burden of software maintenance for users.

Public Cloud hosting: refers to services provided by third-party cloud service providers to multiple users over the internet. It encompasses IaaS, SaaS, and PaaS offerings. Users can access computing resources, applications, or development platforms from the provider's shared infrastructure. Public cloud hosting offers scalability, cost-effectiveness, and eliminates the need for organizations to manage physical infrastructure. Examples of public cloud providers include AWS, Microsoft Azure, and Google Cloud Platform.

Private cloud hosting: involves dedicated infrastructure and resources exclusive to a single organisation. It can be managed internally by the organisation or by a third-party provider. Private cloud hosting offers enhanced security, control, and customisation options. It's commonly used by organisations with specific compliance requirements or sensitive data needing to be kept within their own network.

Database

A database is designed to store different types of data, such as text, numbers, dates, images, and more. It provides a structured framework to categorise and relate the data, making it easier to search, retrieve, update, and manage.



Databases come in different types, such as relational databases, where data is stored in tables with relationships between them, and NoSQL databases, which provide flexible and scalable storage for unstructured or semi-structured data.

Databases are most commonly used in pensions to hold saver data. At a basic level it could be a spreadsheet. More typically it'll be a custom-built database, often hosted in the 'Cloud'.

Optical Character Recognition (OCR)

OCR simplifies the conversion of physical or digital documents into machine-readable text, opening doors to improved productivity, streamlined processes, and enhanced data management. Instead of manually typing the content, OCR software can quickly scan and convert the text into editable and searchable digital formats. This saves time, reduces errors, and improves overall data entry efficiency. OCR technology can achieve high levels of accuracy in text recognition, minimizing the chances of human errors. It can accurately interpret and convert printed or handwritten text, even in complex fonts or languages, into machine-readable formats. This enhances data reliability and ensures more accurate document processing and analysis.

Other resources

National Cyber Security Centre (NCSC) Glossary: https://www.ncsc.gov.uk/files/NCSC_glossary.pdf

Scottish Government Cloud Primer and Benefits of Cloud: <https://www.gov.scot/publications/cloud-primer/>

Accenture – Introduction to Cloud Computing: <https://www.accenture.com/gb-en/insights/cloud-computing-index>

5. Application Programming Interface (API)

Why's it relevant to Pensions?

APIs are central to allowing a pension administration database to interact directly with other applications to create a truly end to end administration service, for example, a foreign payments platform or an ID and Verification system.

APIs are also central to how the Pensions Dashboard will work. APIs enable the Pensions Dashboard to connect with various pension providers and government databases to retrieve pension-related data. These APIs allow authorised access to specific data, A 'find' message will travel via an API carrying details about a saver to all pension schemes enrolled in the project. A 'return' message will be sent back via API.

API

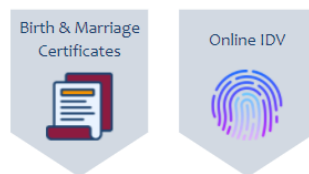
An API is a set of rules and protocols allowing different software applications to communicate and interact with each other. It acts as a bridge, enabling the exchange of data and functionalities between applications.



6. Information Security and Digital Identity Verification (IDV)

Why's it relevant to Pensions?

It's now possible to dispense with certificates and use online services for IDV. There are commercial solutions already available enabling digital verification services and cross-checking identity (using a GDPR compliant data set for address histories, voter records, passport records, DVLA databases etc).



Applications (Apps)

Apps are software programs designed to run on smartphones, tablets, computers, or other devices. They provide specific functions or services to savers, such as communication, productivity, entertainment, or utility. Apps can be downloaded and installed from app stores or other sources, and they offer a user-friendly interface for users to interact with and access various features or content.



Authenticators

Authenticators are tools or applications used to generate or provide the additional credentials or verification codes required for two-factor/multi-factor authentication. They can be software-based or hardware-based. Software authenticators are typically mobile apps generating one-time passwords or codes users enter during the authentication process. Hardware authenticators can be physical devices, such as security tokens or smart cards, which generate or store the additional credentials. Authenticators add an extra level of security and help ensure only authorised individuals can access protected resources or systems.



Authenticator apps generate a one-time code to confirm it's you logging in to a website or service. They provide the second part of 'two-factor authentication' (2FA). See the explanation of two factor authentication below to find out more.

Biometrics

Biometrics, a type of digital identity verification, utilises unique physical or behavioural characteristics of a person to authenticate their identity. Current use cases are tools such as FaceID or TouchID used in smart phones today.



Secure Identification

Biometrics, such as fingerprint or facial recognition, provide a high level of security in verifying a person's identity. These unique physical or behavioural traits are difficult to replicate or forge, making it harder for unauthorised individuals to impersonate someone else. Biometric authentication adds an additional layer of security to digital systems, ensuring that only authorised individuals can access sensitive information or perform certain actions. Smartphones have led the way on this, and some laptops now have this capability as well.

Convenience and Saver Experience

Some modern banking apps use biometrics to set up accounts, sign in and confirm payments. Biometric authentication methods offer convenience and a seamless saver experience. Instead of remembering complex passwords or carrying physical identification documents, individuals can use their own biometric traits, such as a fingerprint or face, to authenticate themselves quickly and easily. This eliminates the need for manual input and reduces the risk of forgotten or stolen passwords.

Fraud Prevention

Since biometric traits are unique to each individual, it becomes extremely difficult for fraudsters to impersonate someone else. This helps prevent unauthorised access to personal accounts, financial transactions, or sensitive data, enhancing overall security and protecting individuals from identity theft.

Encryption

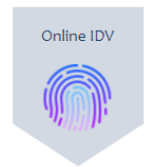
Encryption is a process of converting data into a secure and unreadable form to protect it from unauthorised access or interception. It involves using mathematical algorithms and keys to transform plain text or data into encrypted ciphertext. Encryption ensures even if someone gains unauthorised access to the encrypted data, they can't understand or decipher its content without the corresponding decryption key. It's widely used to secure sensitive information during transmission or storage, providing confidentiality and data protection.



Encryption is a way to keep data safe when it's shared electronically. The data is scrambled (encrypted) when it's sent and can only be unscrambled by the intended recipient. That means if intercepted, it can't be easily read. It's common for pension schemes to be asked if their data is encrypted at rest. This simply means when the database isn't in use the data is encrypted which again helps to prevent malicious access.

IDV

Digital identity refers to the unique representation of an individual's identity in the digital world. It encompasses the collection of personal information, credentials, and attributes that can be used to establish and verify an individual's identity online.



IDV is a necessary process ensuring a person's identity matches the one it's supposed to be. Digital identity providers perform biometric, document and database checks to verify documents are valid and haven't been forged or tampered with.

Quick Response (QR) codes

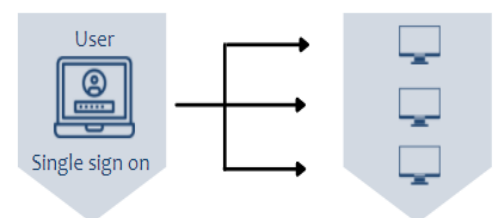
QR codes are two-dimensional barcodes storing information in a machine-readable format. They consist of black and white squares arranged on a square grid and can be scanned by smartphones or other devices equipped with a QR code reader. When scanned, QR codes can provide various types of information or trigger specific actions, such as opening a website, displaying contact details, or initiating a payment. They offer a quick and convenient way to share or access information digitally.



QR codes date back to the 1990's. They're like a two-dimensional bar code and most smartphones have the recognition software built into their camera apps.

Single sign on (SSO)

One aspect which creates friction when using websites is remembering usernames and passwords. Single Sign-On is a technology allowing users to access multiple applications or systems with a single set of login credentials. Instead of remembering separate usernames and passwords for each application, users can authenticate once and gain access to various resources without the need to re-enter their credentials. SSO improves user convenience and productivity by reducing the number of login prompts and simplifying the authentication process.



Two factor authentication (2FA)

2FA adds an extra layer of security to the login process by requiring users to provide two different types of credentials. Typically, it combines something the user knows (such as a password) with something the user possesses (such as a verification code sent to their mobile device). By requiring two factors, 2FA strengthens security and reduces the risk of unauthorised access even if one factor (e.g., a password) is compromised.

Multi-Factor Authentication (MFA)

MFA is an enhanced security measure that goes beyond two factors and requires users to provide additional credentials or proofs of identity during the authentication process. These additional factors can include something the user is (such as biometric data like fingerprints or facial recognition), something the user possesses (such as a

physical security token), or something the user knows (such as a PIN). MFA provides an extra layer of protection against unauthorised access and is more secure than relying on a single factor.

7. User Experience and User Interface

Why's it relevant to pensions?

As we move to a new generation of pension savers who expect an online experience for all their data needs, it's become necessary for pension providers to offer a secure, but also user-friendly online experience. A good user experience (UX) is often delivered via an intuitive user interface (UI) or website. These websites or portals should provide for basic needs such as latest fund values, membership details, modelling tools as well as letters and payslips.



User Experience (UX)

UX refers to the overall experience and satisfaction a saver has while interacting with a product, website, or application. It focuses on understanding user needs, behaviours, and emotions to design and optimise the interaction between the user and the system. UX involves various aspects, including usability, accessibility, efficiency, and the overall enjoyment of using the product. The goal of UX design is to create a seamless and meaningful experience meeting user expectations and achieving their goals

UX designers use wireframes, prototypes and user research to test any interaction a saver has with their pension.

Some things which influence UX are:

- The steps savers need to take to interact with their pension
- How long it takes savers to locate what they need
- How useful and valuable their interaction is
- The thoughts and feelings savers have while they're interacting
- Saver feelings about the overall experience



User Interface (UI)

UI is the specific product users interact with – i.e. the Saver Portal. UI is the visual and interactive part of a digital product that users interact with. It includes the layout, words, visual elements, navigation menus, buttons, forms, and other components enabling users to interact with the system. UI design aims to create an aesthetically pleasing, intuitive, and user-friendly interface that enhances usability and facilitates smooth interactions. It focuses on the visual appeal, consistency, and ease of use of the interface.



Good UX and UI design are essential for creating a positive saver experience by enhancing satisfaction, efficiency, engagement, and accessibility

Omnichannel

Omnichannel is a multi-channel approach to communication and sales, seeking to provide savers with a seamless experience, whether they're online from a desktop or mobile device, by telephone, or face to face. It provides regular contact and consistency in tone of voice and message. Personas are fictional characters used for representing different types of users for helping with a website, brand, or product. It's considered as part of interaction design or a user-centred design.

8. Open Banking and Open Finance

Why's it relevant to pensions?

Up-to-date bank account data and verification of this data is key to the successful and timely delivery of all payments. With the advances made in open banking, most UK banks now validate a bank account belongs to the named individual and thereby reduces the risk of fraud.

The Pensions Dashboards will use open APIs and Covid-19 has accelerated the 'open everything' agenda which is growing beyond the confines of open banking and into the wider world of open finance.

Open Banking

Open Banking refers to the practice of sharing financial data between banks and authorised third-party service providers through standardised APIs. It allows users to securely share their financial information, such as transaction history and account details, with other financial institutions or third-party applications. Open Banking enables users to have more control over their financial data and provides opportunities for innovative financial services and personalised experiences.

Open Finance

Open Finance expands on the concept of Open Banking and extends the sharing of financial data beyond traditional banks. It encompasses the sharing of financial information from various financial institutions, including banks, insurers, investment firms, and other financial service providers. Open Finance aims to foster a more interconnected and collaborative financial ecosystem by enabling users to access a broader range of financial services and leverage their data across different financial sectors.

The FCA outlines their vision of Open Finance for consumers and businesses as follows:

- To gain access to a wider range of financial products/services
- To have greater control over their data
- To engage with their finances and empower better financial decisions

- The end goal is improved financial health driven by market innovation and competition

9. Skills

Why's it relevant to pensions?

Data is integral to all aspects of managing pensions. Having specialist data teams who work with pension managers will ensure pension managers and actuaries can focus on the value-add tasks.

Introducing technology solutions to address specific saver or operational issues requires different skills to pension subject matter experts. Developing saver portals which will ensure savers log in and engage with the content requires a good understanding on what they want and need. UX/UI specialists should be involved together with behavioural scientist.

Some examples of the data being monitored to help improve engagement are:

- General engagement data analytics, broken down into the cohorts split by gender, age, marital status, pension pot size/salary band, length of service
- Activity analysis following announcements or savers communications
- Saver portal engagement – tracking which areas of the portal get the most traction, how long consumers spend on the page and how they navigate
- Analysis of frequently asked questions to help drive improvements in communications

Behavioural insights and biases which can be used to engage savers include:

- Combining pension information with other financial planning tools which will assist the saver with planning for retirement
- Leveraging open banking and analysing spending trends can help inform future patterns and how this may impact the saver
- Nudging savers to take small actions to benefit their future financial health (e.g. encouraging consumers to increase their regular contributions by a small amount, demonstrating potential impact at retirement)

Behavioural Science

Behavioural science describes the study of human behaviour in how emotions, the environment, and social factors can influence decision making and choices.



A behavioural scientist is an expert who studies human behaviour and the factors influencing it. They use scientific methods to understand why people behave the way they do.

For pension savers, behavioural scientists can provide valuable insights into how individuals make financial decisions and what factors influence their savings behaviour. By understanding these patterns and motivations, behavioural scientists can develop strategies and interventions to encourage positive saving habits, increase engagement with pensions, and help individuals make better financial choices for their retirement.

Digital Trail

A digital trail, sometimes called a digital shadow, refers to the collection of digital footprints left by individuals as they interact with digital devices and platforms. It consists of various pieces of digital information and data generated during online activities, such as browsing websites, using social media, making online purchases, or accessing online services. The digital trail forms a record of an individual's online behaviour and can be used to track their activities, preferences, and interests. It can also be analysed to gain insights into user behaviour and provide personalised experiences.

Data Scientist v Data Engineer

A Data Scientist is an expert who uses scientific methods, algorithms, and statistical techniques to extract insights and knowledge from large and complex datasets. They analyse data, build models, and develop algorithms to solve complex problems and make data-driven decisions. Data Scientists have expertise in programming, statistics, machine learning, and data visualisation. They work with Data Engineers to access and manipulate data and collaborate with business stakeholders to understand and address analytical requirements.

A Data Engineer is responsible for designing, building, and maintaining the infrastructure and systems necessary for collecting, storing, and processing large amounts of data. They focus on the development and optimisation of data pipelines, data warehouses, and databases. Data Engineers ensure data quality, security, and reliability, and they work closely with Data Scientists and analysts to provide them with the necessary data and tools for their work. They have expertise in database technologies, programming languages, data integration, and data architecture.

Product Manager

Product Managers own the business strategy behind a product, specify its functional requirements, and generally manage the launch of features. Delivering a good digital experience requires specific skills in documenting user journeys, conducting focus groups and testing the saver experience to ensure it's easy to use.

Product Managers focus on understanding saver needs, conducting market research, defining product requirements, and overseeing the product's lifecycle from ideation to launch and beyond.

Project Manager

A Project Manager is responsible for planning, organising, and managing the execution of specific projects within an organization. They ensure projects are completed on time, within budget, and meet the desired objectives. Project Managers coordinate resources, set project timelines, monitor progress, and mitigate risks. They're responsible for communication and collaboration among team members and stakeholders to ensure project success.

10. Project Methodology (Agile vs Waterfall) and Software Development Lifecycle (Development vs UAT vs Penetration Testing)

Why's it relevant to pensions?

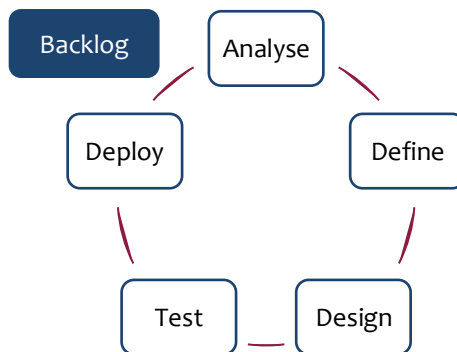
Integrating technology solutions into existing pensions processes is a project. Whether it's performed in-house or using an outsourced technology provider, it's important to understand the key project milestones and how the technology solution will be delivered.

There are two project methodologies – Waterfall and Agile

Waterfall



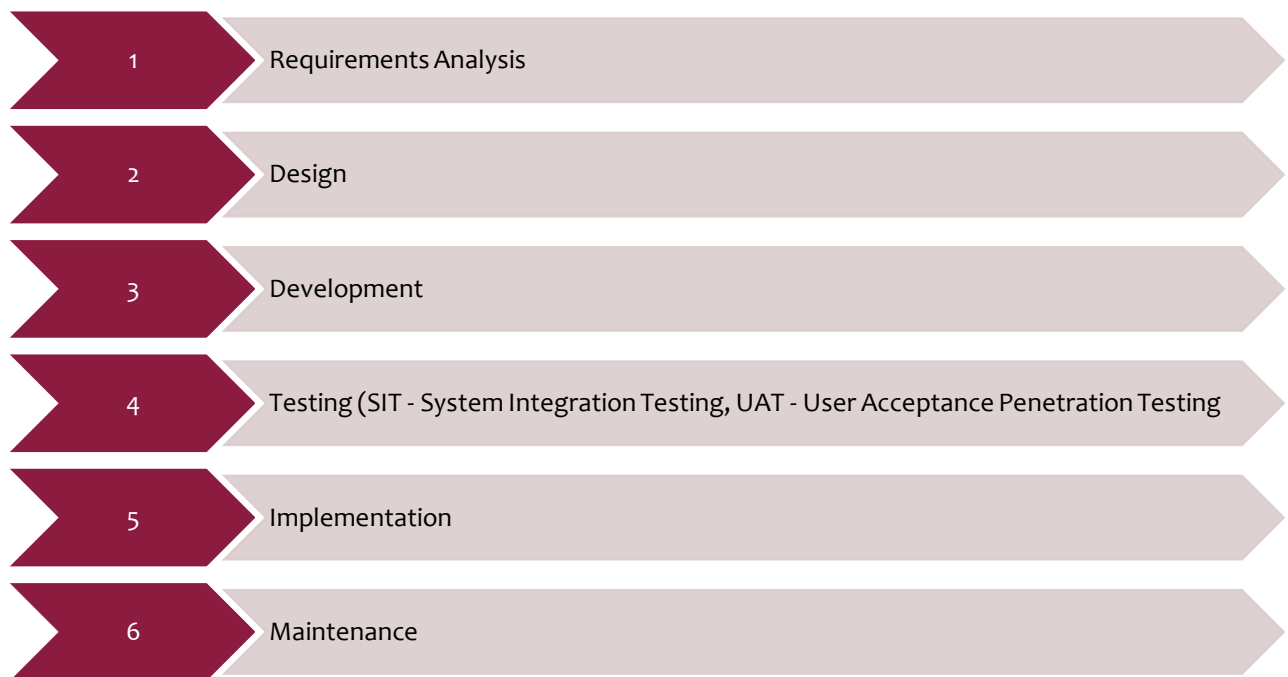
Agile



Waterfall project methodology

Waterfall project methodology is a sequential, linear process of project management. It consists of several discrete phases and no phase begins until the prior phase is complete – i.e. clear entry and exit criteria before moving to the next phase.

The stages are:



Agile project methodology

Agile is a collaborative, cross-functional approach to completing work and requirements. Agile methods break projects into individual deliverable pieces over iterative periods. These 'time-boxed' phases are called 'sprints' and last just a few weeks. Once each sprint is completed, the feedback from the previous phase is used to plan the next.

Kanban and Scrum are two different agile strategies. Kanban is continuous and more fluid, whereas Scrum is based on short, structured work sprints.

Kanban

Kanban is all about visualising work, limiting work in progress, and maximising efficiency (or flow). Kanban teams focus on reducing the time taken to deliver a project from start to finish. This is done by using a Kanban board and continuously improving flow of work.

Scrum

Scrum is a framework which helps teams work together. Much like a rugby team (where it gets its name) training for the big game, scrum encourages teams to learn through experiences, self-organise while working on a problem, and reflect on wins and losses to continuously improve.

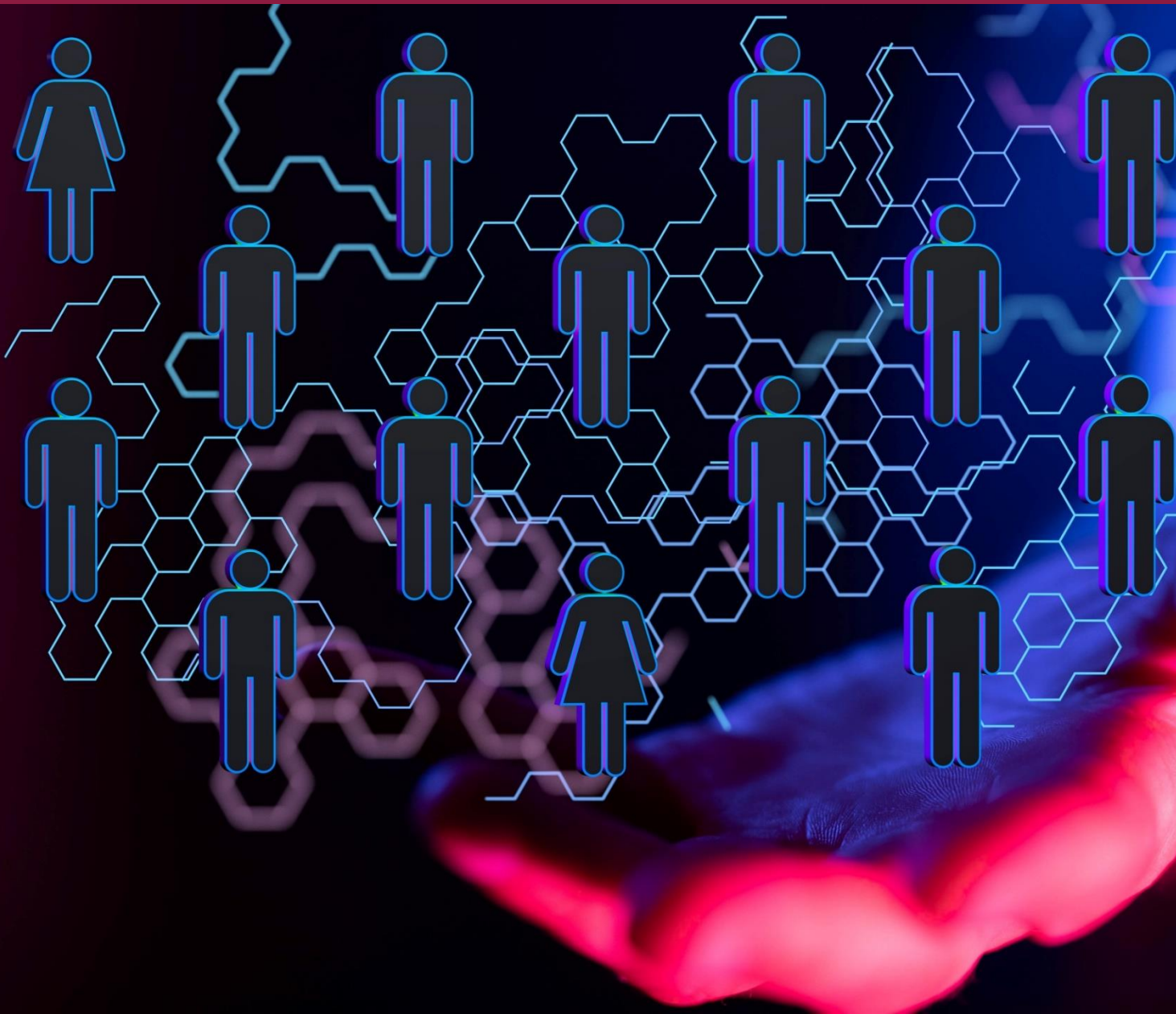
Scrum Master

Scrum masters are the facilitators of scrum, focusing on the time-boxed iterations called sprints.

11. Conclusion

Now we've explained a number of the key technology terms the Digital Admin Working Group will use in all papers going forward, we look forward to delivering further use cases on how people and technology can work together to enhance the saver experience.

Please contact us at info@pasa-uk.com with any questions or further definitions you would like added to the jargon buster.



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