

1 Preliminary Market Research

As preliminary market research, we have followed several criteria for evaluation of the existing solutions to analyse the market research as follows:

Table 1: Criteria for selecting the researched tool

Criteria	Description
Type	Determines the system's open-source or proprietary status, which determines control, cost, and flexibility.
Cost	The focus is on cost-effectiveness, considering both setup and ongoing operating costs, ensuring solutions provide substantial financial value.
Core Functionalities	The system requires automated logging and complaint classification based on initial inputs from staff assessments and service user feedback.
Scalability/Flexibility	As PBL Care's operational requirements grow, the system must expand to accommodate more customers and complaints without compromising efficiency.
Use Case	Systems are designed for specific situations, such as managing confidential information, managing multiple departments, or providing multi-channel support.
Limitation	The system's long-term suitability is ensured by assessing its operational or technical limitations.
Utilisation of AI/ML	The tool utilizes artificial intelligence (AI) techniques like natural language processing (NLP) to enhance complaint registration,

	classification, and analysis, thereby enhancing accuracy and efficiency.
Analysis	This application can analyse data, spot trends, assess the effectiveness of services, and direct decision-making procedures.
Compliance	The tool is regulated by healthcare and data protection regulations like GDPR and CQC requirements.
User Adoption and Support	It guarantees that the system is easy to use for employees and service consumers as well, reducing the need for training and promoting ease of use. Evaluate the quality and accessibility of new user support and training materials. More seamless transitions and improved adoption can be facilitated by thorough training and easily available support resources.
Ongoing Support and System Maintenance	Crucial to long-term sustainability, with an emphasis on dependable service and simple system changes. Consider the provider's history of adding new features and security precautions to the system. Regular upgrades can guarantee that the system remains secure and up to date.
Security	Robust data security protocols to prevent unwanted access to confidential information.
Data Portability	Data exporting and transferring across systems must be simple, especially when using data analytics tools or for backup and recovery.
Customisation Flexibility	Although various customization options have been considered, it is important to specifically assess how much the system can be modified to fit the unique processes and evolving requirements of PBL Care.

Integration with other systems	Ensure the system can seamlessly integrate with existing healthcare management systems. HR systems, and other software tools used by PBL Care. This could include electronic health records (EHR), customer relationship management (CRM) systems, or enterprise resource planned (ERP) systems.
Regulatory Futureproofing	Beyond current compliance, consider how well the system can adapt to potential future changes in healthcare regulations and standards.
Environmental Impact	If sustainability is a concern for PBL Care, evaluating the environmental impact of deploying and maintaining the system could be considered. This includes server energy consumption if hosted on-premises or the environmental policies of the cloud provider if hosted.
Feedback Mechanisms	Ensure there are effective mechanisms for collecting feedback from users about the system's functionality and usability, which can inform continuous improvement.
Vendor Stability and Reputation	Research the stability and market reputation of the software provider. A stable vendor with a solid reputation is more likely to provide reliable long-term service and support.
Disaster Recovery and Business Continuity	Evaluate the system's capabilities in terms of data backup, recovery solutions, and its role in the business continuity plans of PBL Care.

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Table 2: Tools Analysis

Tool	Type	Approx Cost (USD)	Criteria Matched	Usefulness in Healthcare	Link	Compliance	User Adoption and Support	Feedback Mechanisms	Vendor Stability and Reputation	Environmental Impact	Key Analysis Points
osTicket	Open Source	Free, Varies	Customization, Scalability, Integration	Efficient patient inquiry management, adaptable to healthcare systems.	osTicket	GDPR, HIPAA (with customization)	Moderate; requires technical expertise	Community forums	Stable, widely used	Low; cloud-based reduces footprint	Highly Customizable, requires technical setup
OTRS Community Edition	Open Source	Free, varies	Customization, Scalability, Compliance	Ideal for multi-department healthcare workflow	OTRS	GDPR, HIPAA (customisable)	High, extensive training required.	Community feedback, direct support options	Stable, reputable in IT	Low, cloud-based	Strong process management, complex setup
MantisBT	Open Source	Free, Varies	Customization, Security, Tracking	Tracks and manages clinical issues and complaints	MantisBT	Can be configured for GDPR, HIPAA	Moderate, user-driven	Issue tracking system	Stable, less known outside IT	Low, server-based	Effective for detailed tracking, not healthcare-specific
Redmine	Open Source	Free, Varies	Scalability, Customisation, Integration	Manages healthcare projects and complaints	Redmine	GDPR, HIPAA (with plugins)	Moderate, developer-focused	Community forums, Issue tracking	Stable, open-source community	Low, server or cloud-based	Requires customization for healthcare use
Zammad	Open Source	Free, Varies	Multi-channel Support,	Manages multi-channel patient communications	Zammad	GDPR, potential for HIPAA	High, user-	Direct user feedback, analytics	Emerging, growth	Moderate, cloud-hosted	Modern interface, growing

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			Customisation, AI/ML				friendly interface				community support
Zendesk	Private	Starts at \$19/agent/month	AI/ML, Multi-channel Support, Scalability	Advanced patient interaction management across channels	Zendesk	GDPR, HIPPA	Very High, extensive resources	Surveys, automated feedback	Vary stable, industry leader	Moderate, extensive cloud usage	Comprehensive AI features, extensive for large scale
Salesforce Health Cloud	Private	\$25 to \$300+/user/month	Customisation, Compliance, Integration	Comprehensive patient data Integration and management	Salesforce	GDPR, HIPPA, others	Very High, complex features require training	Integrated within platform	Very stable, industry-leading	Moderate, significant infrastructure	Excessive cost, effective features, best for large organisations
Freshdesk	Private	Free to \$15/agent/month	Scalability, User Support Customisation	Centralized management of patient queries and complaints	freshdesk	GDPR, potentially HIPPA	High, Intuitive platform	Ticket-based feedback, surveys	Stable, reputable	Low, cloud-based	Flexible, cost-effective, suitable for various healthcare sizes
Medallia	Private	Custom pricing	AI/ML, Real-time Analytics, Multi-channel support	Enhances patient care through real-time feedback analysis	Medallia	GDPR, HIPPA	High, specialised for client experience	Real-time feedback, in-depth analytics	Stable, well-regarded in CX	Moderate, data-intensive operations	Specializes in patient experience, requires significant data handling
Healthgrades	Private	Custom pricing	Feedback Mechanisms, User Adoption, Multi-department Support	Specialises in managing patient satisfaction and healthcare provider ratings	Healthgrades	GDPR, potential for HIPPA	Moderate, healthcare provider-focused	Patient reviews and feedback	Stable, well-known in healthcare	Low, primarily an online platform	Focused on patient satisfaction, limited in direct complaint management

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Tool		Use Case			Cost		Features			Compliance			Implementation			Technical Requirements			User Adoption			Vendor Stability			
✓ x	Availability	Healthcare	Retail	Hospitality	Free Version	Premium Version (USD) / Varies	Customisable	Scalable	Add-ons acceptance	Secure	CQC	HIPPA	GDPR	Setup Complexity	User Interactivity	Integration Capabilities	OS Compatibility	AI Adaptability	Computational Requirements	Feedback Mechanism	Training Requirements	Ease of Use	Market Presence	Growth Stability	Reputation
osTicket	Open - Source	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	M	✓	✓	H	✓	✓	✓	M	✓	H	H	✓
OTRS Community Edition	Open - Source	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	H	✓	H	M	H	M	H	H	✓
MantisBT	Open - Source	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	M	✓	✓	H	✓	✓	L	M	M	H	M	✓
Redmine	Open - Source	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	H	✓	M	M	M	M	H	H	✓
Zammad	Open - Source	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	M	✓	✓	M	✓	M	M	M	✓	M	M	✓
Zendesk	Private	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	L	✓	M	H	L	✓	H	H	✓

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Salesforce Health Cloud	Private	✓	x	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	H	✓	H	M	H	M	H	H	✓
Freshdesk	Private	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	L	✓	L	H	L	✓	H	H	✓
Medallia	Private	✓	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	H	M	H	M	H	H	✓
Healthgrades	Private	✓	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	M	✓	✓	M	✓	M	M	M	✓	H	H	✓

1.1.1 Keynote:

- **Availability:** Open-Source or Private
- **Use Case:** Healthcare, Retail, Hospitality
- **Cost:** Free version available, Premium version varies
- **Features:** Customizable, Scalable, Integrable, Secure
- **Compliance:** CQC, HIPPA, GDPR
- **Implementation:** Setup Complexity (M= Medium, L= Low, H= High), User Interactivity, Integration Capabilities

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- **Technical Requirements:** OS Compatibility, AI Adaptability, Computational Requirements (L= Low, M= Medium, H= High)
- **User Adoption:** Feedback Mechanism, Training Requirements (L=Low, M= Medium, H= High), Ease of Use
- **Vendor Stability:** Market Presence, Growth Stability, Reputation (L=Low, M=Medium, H= High)

1.2 Discussion and Market Gap:

Operational Efficiency: Operational efficiency in complaint management is crucial for reducing resolution times and increasing the overall productivity of PBL Care. Streamlining processes through automation and digital solutions can minimize manual handling, thus reducing human error and the associated workload for staff. This not only enhances service quality but also improves customer satisfaction.

Compliance and privacy: Compliance with regulatory requirements such as CQC (Care Quality Commission), GDPR, and healthcare-specific privacy laws is mandatory. The automated system standards such be designed to secure personal data and comply with these regulations effectively, thereby safeguarding service user information and ensuring that PBL Care meets its legal obligations.

Intelligence: Leveraging AI and ML technologies can transform the complaint management process by enabling sophisticated data analysis and trend prediction. This can lead to more proactive management, identifying potential issues before they escalate, and tailoring responses to the specific needs of service users based on past interactions.

User-usability: The system must be accessible and easy to use for all service users, including those with disabilities. This involves creating intuitive user interfaces and using voice-to-text technologies to aid those who may have difficulty with traditional typing or navigation.

Budget: Consideration of budget constraints is essential. It is important to find a balance between cost and functionality, starting with a basic system with scalable features that can be enhanced or expanded as budget permits or needs evolve.

Scalability and Flexibility: The chosen solution should grow with the organisation and be flexible enough to adapt to changing requirements. This includes being able to handle an increasing volume of complaints and integrating with other systems as PBL Care expands its services.

Digitalising Historical Data: To leverage the full value of historical data, the system should include capabilities to digitize and categorize old records. This would enhance the ability to conduct thorough trend analyses and improve service based on historical insights.

1.3 Assessing Technical Resources and Expertise

1.3.1 In-house Technical Capabilities

- PBL Care should assess its in-house technical capabilities. If technical expertise is readily available, open-source solutions like Redmine or OTRS may offer long-term benefits and greater control over customization.
- If technical resources are limited, turnkey solutions like Zendesk or Freshdesk would be more appropriate due to their user-friendly interfaces and extensive support networks.

1.4 Immediate vs. Long-Term Needs

- For immediate deployment with minimal setup, cloud-based proprietary solutions like Zendesk, Freshdesk, or Zoho Desk are ideal. They are quick to implement and offer a straightforward subscription model.
- For long-term solutions, particularly if PBL Care is looking to scale up its operations or integrate complaint management with broader organizational processes, Salesforce Service Cloud or a robustly implemented Office 365 suite could be considered.

1.5 Budget Constraints

- If budget constraints are a significant factor, starting with services like Zoho Desk or Freshdesk, which offer free tiers, would be beneficial. This approach allows PBL Care to scale up and opt for more advanced features as the budget allows or as the need for more sophisticated tools becomes apparent.

1.6 Regulatory Compliance

- Any solution chosen must comply with regulatory standards such as GDPR and healthcare-specific privacy laws. Salesforce and Office 365, for example, offer strong compliance features but may come at a higher cost.

1.7 AI and ML (Machine Learning) Utilization

- For advanced data analysis, trend prediction, and automated handling, solutions with AI capabilities like Zendesk or Salesforce should be explored. Although initially more

expensive, the long-term efficiency gains and improved user experiences can justify the investment.

1.8 Scalability and Flexibility

- PBL Care should consider how the chosen solution can grow with the organization. Private solutions like Jira service Management and Salesforce are highly scalable and can be customized extensively, although they might require a larger initial investment in terms of time and money.

1.9 Technical Resources

- If PBL Care has access to technical expertise, leveraging open-source tools could offer the most customization at a lower ongoing financial cost. If not, the simplicity and support offered by private solutions may justify higher costs.

Table 3 Market Gaps.

Feature	Tool(s)	Market Gap	Solution
Operational Efficiency	osTicket, OTRS, Redmine	requires technical expertise for installation and maintenance, which may reduce operating effectiveness in non-technical settings.	Development of simpler user interfaces and automated setup procedures to reduce reliance on technical expertise.
Compliance and privacy	Zammed, MantisBT	To completely adhere to HIPPA and CQC regulations, more customisations could be necessary.	To guarantee out-of-the-box compliance, integrate compliance modules tailored to the healthcare and other regulated industries.

Intelligence	Redmine, MantisBT, osTicket	limited ability of AI to support analytical decision-making.	To improve data analysis and forecasting capacities, employ machine learning and artificial intelligence characteristics.
User-usability	OTRS, MantisBT, Redmine	complex user interfaces that could be challenging for non-technical people.	Optimize the requirement for training and increase user acceptance by streamlining user interfaces and improving documentation.
Budget	Salesforce Health Cloud, Medallia	Expensive costs could be out of reach for smaller businesses.	Offer a basic free tier as well as tiered pricing structures to suit a larger range of monetary constraints.
Scalability and Flexibility	Zammed, osTicket	However scalable, customization and scaling may need a large amount of technical work.	Establish a more modular designs to facilitate growth and modification with less technical assistance.
Digitalising Historical Data	All. Particularly Salesforce and Medallia	Effective integration of historical data is not the primary focus of most tools.	To accelerate digital transformation procedures, improve historical data integration, OCR, and scanning capabilities.

