Constructing an Evaluation Framework for Assessing Dashboards

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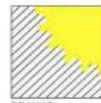Marta Pych
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ABSTRACT

In today's digital age, public facing dashboards play a pivotal role in facilitating effective communication between government institutions and the public. However, the lack of standardised evaluation frameworks poses a challenge in assessing their impact and efficiency. This paper addresses this crucial gap in the research by proposing a comprehensive evaluation framework specifically designed to assess public facing dashboards with a specific focus on their implementation within the Indian Justice System and E-governance Portals. This evaluation framework aims to provide a structured approach to assess the content, visual representation, social parameters and methodology principles of public facing dashboards in order to contribute in enhancing governance delivery and access to justice in the country.

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1.1 INTRODUCTION

This report explores the conceptual and practical elements of public facing dashboards. Specifically, it proposes a comprehensive evaluative framework for creating dashboards, focusing on the Indian Justice System and its E-governance Portals. The report's main objective is twofold. First, it is intended to provide clear guidelines, best practices and recommendations for the creation of public facing dashboards for their developers and their sponsors. Second, it aims to raise public awareness about the use and impact of dashboards in the Indian Justice System. Ultimately, it aims to provide solid recommendations for optimising the functionality and efficiency of these dashboards, thus contributing to improved governance delivery in India.

To reach these objectives, the report proposes an extensive investigation of key metrics put into context, constituting the backbone of an evaluation framework of dashboards.

Dashboards are interfaces displaying data sorted in a relatively small collection of interconnected key performance metrics and underlying performance drivers that reflect both short- and long-term interests to be viewed in common throughout a given organisation.[1] Dashboards are **public facing** if they are designed for communication with the public and accessible without gatekeeping measures, i.e., prior authentication. Since the 2010's, public facing dashboards have been used in relation with governance and decision-making and are omnipresent in organisations. Those are exclusively examined in this report.

Today, dashboards are integral to governance delivery and development, promoting uniformity in metrics and procedures for monitoring performance and scheme execution. In the context of access to justice, these tools, particularly public-facing dashboards, simplify complex judicial information, making it accessible and user-friendly for the public, facilitating a greater understanding of the legal system, and establishing transparency between governmental bodies and the citizenry. By translating intricate legal information into accessible, digestible data, dashboards can bridge the gap between the justice system and the public, ultimately making justice more accessible. Beyond establishing objectives and strategic plans, dashboards provide a

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[1] Pauwels, Koen & Ambler, Tim & Clark, Bruce & LaPointe, Pat & Reibstein, David & Skiera, Bernd & Wierenga, Berend & Wiesel, Thorsten. (2009). Dashboards as a Service : Why, What, How, and What Research Is Needed?. Journal of Service Research. 12. 175-189. 10.1177/1094670509344213

feedback mechanism to refine processes and continuously motivate team members. They articulate performance through selected metrics, creating a transparent line of communication with stakeholders. This level of transparency fosters trust within the system, enhancing public faith in the justice system. Essentially, dashboards represent the intersection of service delivery, performance measurement, and public trust, underpinning the drive towards accessible justice and sustainable development.

Developing a dashboard requires forward thinking and planning. It requires developers to select key metrics before populating the dashboard with data. It requires items to be put in relation with each other and using those to forecast scenarios about a given topic. It goes further than having access to data in a well-presented manner implemented by developers. Their implementation relies heavily on both actors (sponsors and developers) working hand in hand: the sponsors would frame their dashboards to the developers (their objectives, the direction they should follow), and the developers implement them in light of their understanding of the instructions. Therefore, it is a joint efforts that requires a direction, a purpose, as well as giving the developers the means to achieve them.

In conclusion, dashboards function as more than mere data aggregators. They embody the symbiotic relationship between public service delivery, performance measurement, and public trust. By providing a clear line of sight into performance data and institutional goals, dashboards catalyse the pursuit of accessible justice, enhanced governance, and sustainable development.

The report unfolds as follows:

- First, we define the scope and significance of the report and the research questions associated with the creation of the evaluative framework for dashboards.
- Second, we review the use of dashboards in the literature.
- Third, in light of the literature, we propose a set of criteria for the evaluation of the dashboards.
- Fourth, we apply our findings by reviewing two public facing dashboards (the National Prison Information Portal and the National Judicial Data Grid) through our proposed evaluation criteria.
- Lastly, we conclude on our findings and the limitations of the report.

1.2 SCOPE AND SIGNIFICANCE OF THE REPORT

The scope of activities in this report is two-fold:

The India Justice Report (IJR) ranks the competency of governments in 18 large and 7 small Indian states in administering justice through their formal justice systems. The evaluation criteria are based strictly on government data, focusing on structural capacity. The assessment covers budgets, human resources, infrastructure, workload, and diversity across four key pillars of the justice system: the police, prisons, judiciary, and legal aid. In addition to providing a snapshot, the IJR analyses data over a five-year period to evaluate the progress and intent of governments to improve justice administration.

This report aims to establish a suitable framework for assessing the public-facing dashboards developed as a part of India's digitisation of its justice system and other public services. Particular emphasis will be placed on developing criteria to evaluate the quality, nature, scope, and frequency of data provided by these dashboards, considering several factors, including the relevance, comprehensiveness, and completeness of the data, the users' experience when interacting with the data contained in the dashboards, and mechanisms allowing for their continuous improvement. Such evaluative frameworks would facilitate assessing the effectiveness of e-governance initiatives in improving access to and delivery of justice.

The process involves investigating a main encompassing question and three sub-questions. In particular:

What evaluation frameworks would be suitable to assess the quality of the dashboards developed for public information as a part of the digitalisation of India's justice system?

- How can we develop frameworks to evaluate the performance of these dashboards?
- How can we find suitable criteria and metrics that would measure the quality of data contained in the dashboards and their performance?
- How can we make the evaluation frameworks suitable for assessing accessibility of these dashboards to the general public?

By answering these questions, the report aims to gain a deeper understanding of the standard the dashboards envisioned to improve access to justice should meet and lay the foundation for the

assessment of the quality of the dashboards developed in India and its efficiency in promoting effective governance delivery and access to justice.

The significance of this report is multifaceted and far-reaching as an application of the evaluative framework developed by this report can offer substantial contributions to various aspects of Indian governance and public services. Here are the key points about its significance:

- **Insights into Justice Administration:** The India Justice Report (IJR) provides a detailed analysis of the state-wise performance of the justice administration. The evaluative frameworks will aid in understanding the public-facing dashboards' strengths and weaknesses, offering a robust foundation to assess digital initiatives aiming to improve justice delivery.

- **Enhancing Accountability:** By providing a basis for scrutinising the content, visual representation, social parameters, and methodology principles of these dashboards, the criteria developed according to the report can help foster greater accountability. The application of the evaluative criteria would support good practices in relation to sharing data with the general public, such as data being comprehensive, accurate, and up-to-date, encouraging transparency, and increasing citizens' trust in government operations.

- **Improvement Recommendations:** The criteria and metrics provided by this report can facilitate the overall improvement and optimisation of the existing dashboards, as well as the development of new public-facing dashboards. The assessment of the data management, user-friendliness, and performance of these dashboards in light of the metrics established by the report would provide a basis for valuable recommendations in relation to their enhancement.

- **A benchmark for Improvement:** The report's evaluation framework can serve as a benchmark for improvement. By comparing available data against the framework, the insights into the quality of efforts made by governments and the effectiveness of these efforts can be provided, helping governments identify gaps and create better strategies for justice delivery.

1.3 LITERATURE REVIEW

In order to achieve the objective of producing dashboard evaluation criteria in the context of access to justice, with a specific focus on the Indian Justice System and its E-governance Portals, we conducted an extensive literature review. The review aims to enhance the understanding of the contemporary dashboard evaluation standards. The findings of the literature review will assist in determining the evaluation criteria necessary for assessing access to justice dashboards.

To start with, in order to effectively create a dashboard, it's necessary that it meets the objectives defined and provides a clear context for the displayed contents.[2] The **content** of the dashboard is assessed based on two factors, the information quality and quantity.[3] The information quality of a dashboard refers to the relevance and comprehensibility of the data displayed while the information quantity of a dashboard pertains to the number of metrics, data points, and visualisations included.

An effective and useful dashboard is composed of **visual elements** that promote interactivity and user feedback. Users shall be allowed to interact and engage with the data by filtering data and adjusting parameters.[4] Furthermore, a feedback mechanism constitutes a useful addition in order to facilitate users in sharing their experiences, reporting issues, and suggesting improvements. Additionally, a useful and effective dashboard should be evaluated for its ease of use and navigation. This requires assessing the intuitiveness of the dashboard's design and the ease of its navigation elements. According to Nielsen, the dashboard should be designed to make it easy for users to find the information they seek and the navigation structure should be clear and understandable.[5] Furthermore, the dashboard's performance on various devices and screen sizes,

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[2] Mahtab Karami, Mostafa Langarizadeh, Mansoor Fatehi, "Evaluation of Effective Dashboards: Key Concepts and Criteria" (2017) doi: 10.2174/1874431101711010052 accessed 13 July 2023 Open Med Inform J. 2017; 11: 52–57

[3] Sohrab Almasi, Kambiz Bahaadinbeigy, Hossein Ahmadi, Solmaz Sohrabei and Reza Rabiei, "Usability Evaluation of Dashboards: A Systematic Literature Review of Tools" (2023) doi: 10.1155/2023/9990933 Accessed 13 July 2023 Biomed Res Int

[4] Jeffrey Heer and Ben Shneiderman, 'Interactive Dynamics for Visual Analysis' (2012) 55 Communications of the ACM 45 https://doi.org/10.1145/2133806.2133821 accessed 24 June 2023.

[5] Jakob Nielsen, *Usability Engineering* (Academic Press 1993). https://books.google.nl/books?hl=en&lr=&id=95As2OF67f0C&oi=fnd&pg=PR9&dq=Nielsen,+J.+(1993).+Usability+engineering.+Elsevier.+Parmenter,+D.+(2015).+Key+Performance+Indicators:+Developing,+Implementing,+and+Using+Winning+KPIs.+John+Wiley+%26+Sons.&ots=3cGECsfq-r&sig=hPHHu6vMJUfkYNmxruIYe4eI5kQ&redir_esc=y#v=onepage&q&f=false

referred to as responsiveness and mobile compatibility, is another crucial aspect. This involves evaluating whether the dashboard is easily viewable and functional across devices and performs consistently.[6] Lastly, communicating updates and changes to the dashboard's users is essential. A dashboard should have a system to notify users about any significant updates or changes and there should be a clear record of changes made to the dashboard for transparency and tracking purposes.[7]

An important consideration regarding the evaluation of dashboards concerns **social parameters.**

According to Abascal and Nicolle, an effective dashboard ought to be designed in order to be accessible to all citizens, including those with varying demographic backgrounds, residing in different geographical locations, and having different educational backgrounds or physical capabilities.[8] As such, the metrics for evaluation should include demographic and geographical accessibility and considerations for individuals with disabilities according to the Web Content Accessibility Guidelines (WCAG).[9] Localisation and cultural consideration are also vital parameters. Considering the country's diverse linguistic landscape, the dashboard should be available in various languages across India.[10] Furthermore, cultural variations and norms should be reflected in how the information is presented. A dashboard should consider the inequalities in access to resources and potential disparities that may arise.[11]

Finally, dashboards are assessed on the basis of their **methodology principles.** Transparency and accountability constitute valuable guidelines that examine whether the dashboard delineates its sources and methodologies and whether it provides current and accurate data. According to Heald,

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[6] Vlad Derdeicea, 'Designing Memorable Dashboards' (*Medium*, 21 March 2023) https://uxdesign.cc/designing-memorable-dashboards-4a4fc2d829a4 accessed 21 June 2023.

[7] Ricardo Matheus, Marijn Janssen and Devender Maheshwari, 'Data Science Empowering the Public: Data-Driven Dashboards for Transparent and Accountable Decision-Making in Smart Cities' (2020) 37 Government Information Quarterly 101284 https://www.sciencedirect.com/science/article/pii/S0740624X18300303 accessed 21 June 2023.

[8] Julio Abascal and Colette Nicolle, 'Moving towards Inclusive Design Guidelines for Socially and Ethically Aware HCI' (2005) https://academic-oup-com.tilburguniversity.idm.oclc.org/iwc/article/17/5/484/701432?login=true&token=eyJhbGciOiJub25lIn0.eyJleHAiOjE2OTAxODkxMzMsImp0aSI6IjQxNmZlNDJlLTBjZjAtNDUwOC05NDAyLWRkNGQyZmRjNzk0ZCJ9 accessed 24 June 2023.

[9] Web Content Accessibility Guidelines (WCAG) 2.1' https://www.w3.org/TR/WCAG21/ accessed 21 June 2023.

[10] Apala Lahiri Chavan and others, 'The Washing Machine That Ate My Sari---Mistakes in Cross-Cultural Design' (2009) https://www.researchgate.net/publication/220383012_COVER_STORYThe_washing_machine_that_ate_my_sari---mistakes_in_cross-cultural_design accessed 24 June 2023.

[11] Lars Osberg, 'Inequality' (Pergamon, Oxford 2001) https://dalspace.library.dal.ca/bitstream/handle/10222/72966/inequality.pdf?sequence=1

each piece of data should have a clearly defined source.[12] The methods used to collect, filter, and present the data should be explained clearly. Moreover, the dashboard should reflect the most recent available data and have mechanisms to verify data accuracy. Reliability and continuity are also critical metrics. A dashboard should always be available, barring scheduled maintenance, functional, and reliable.[13] It should have a regular update schedule, including adding new data, feature enhancements, and bug fixes. Impact and usage should also be considered. This involves measuring whether the dashboard is being used and whether it is positively impacting its intended goal. This requires regular user traffic statistics, satisfaction surveys, and periodic dashboard impact assessments.[14]

In conclusion, the design and functionality of a dashboard significantly impact its ability to serve its intended purpose. The proposed evaluation framework presents a comprehensive approach to assessing a dashboard, ensuring the examination of a variety of valuable elements that foster its high quality.

2. EVALUATION CRITERIA

This report presents a comprehensive evaluation framework for assessing the overall quality of access to justice dashboards. We categorise the evaluation criteria into four key areas: Content, Visual Representation, Social Parameters, and Methodology Principles. Each category encompasses a selection of evaluation criteria that cover all significant aspects pertaining to an access to justice dashboard. Each criterion is further divided into metrics that facilitate and systematise the evaluation process. This evaluation framework aims to provide a structured approach to evaluating and improving the effectiveness of access to justice dashboards.

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[12] David Heald, 'Fiscal Transparency: Concepts, Measurement and UK Practice' (2003) 81 Public Administration 723 https://onlinelibrary.wiley.com/doi/10.1111/j.0033-3298.2003.00369.x accessed 24 June 2023.

[13] Ricky Smith and R Keith Mobley, *Rules of Thumb for Maintenance and Reliability Engineers* 35 (Butterworth-Heinemann 2011)

[14] Peter B Seddon and others, 'How Does Business Analytics Contribute to Business Value?: How Does Analytics Contribute to Business Value?' (2017) 27 Information Systems Journal 237 https://onlinelibrary.wiley.com/doi/10.1111/isj.12101 accessed 24 June 2023.

The evaluation criteria are the following:

2.1 Content

The "Content" category of evaluation criteria in this report focuses on assessing the quality of information presented in dashboards. It comprises two evaluation criteria, *Relevance and Comprehensibility* and *Information Completeness*.
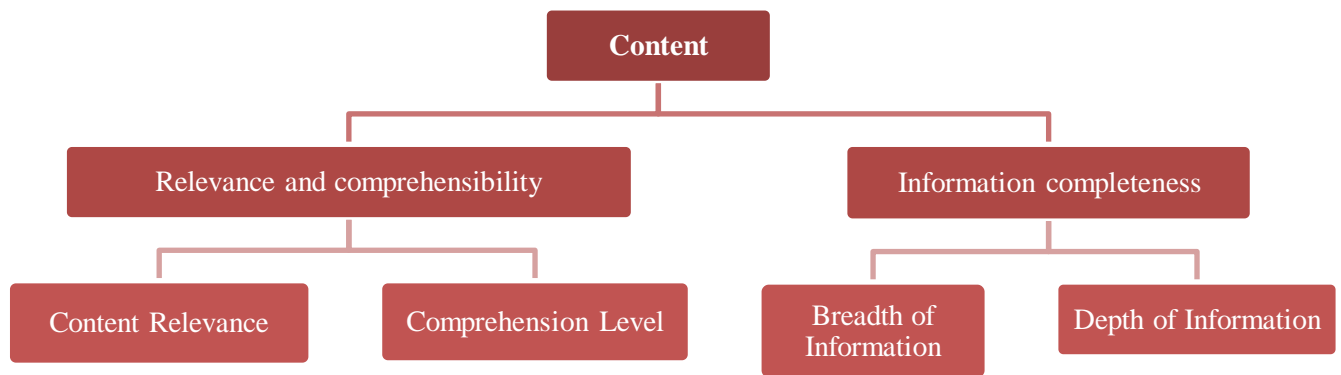
The first criterion, **_Relevance and Comprehensibility_** has been selected to ensure that the dashboard effectively communicates information that is both relevant to the subject of assessment and easily understandable by the intended audience. The metric of **Content Relevance** enables the evaluation of whether the presented data aligns with the specific goals and objectives of the assessment, particularly in relation to access to justice. The second metric, **Comprehension Level,** assesses whether the dashboard is designed in a user-friendly manner, allowing users to comprehend the information without requiring expert knowledge.

The second criterion, **_Information Completeness_** focuses on assessing whether the dashboard provides a comprehensive view of the subject matter, specifically related to access to justice. The chosen metrics within this criterion, *Breadth of Information* and *Depth of Information* were selected to ensure a thorough evaluation. **Breadth of Information** assesses whether the dashboard covers all critical aspects of the information, encompassing various dimensions relevant to access to justice. **Depth of Information** evaluates whether the dashboard provides sufficient detail for each aspect, enabling users to develop a comprehensive understanding of the subject matter.

By including these evaluation criteria and metrics within the *Content* category, the report aims to holistically evaluate the quality of the information presented in dashboards. The chosen criteria were selected to assess the relevance, comprehensibility, coverage of critical aspects, and level of detail provided, ensuring that the dashboards effectively convey pertinent information regarding access to justice in a user-friendly manner.

2.1.1 Relevance and Comprehensibility

This criterion examines if the dashboard effectively communicates information related to access to justice in a manner that the ordinary citizen can understand.[15]

2.1.1.1 Metric - Content Relevance

The metric assesses if the dashboard presents data relevant to the subject of assessment. Content relevance in a dashboard evaluation involves assessing whether the data presented aligns with the goals, objectives, and purpose of the dashboard. It focuses on determining if the information is appropriate, accurate, specific, and applicable to the specific domain or industry. Evaluating content relevance involves considering factors such as **accuracy, specificity, and applicability** to ensure that the data addresses the core components and requirements of the subject matter.

2.1.1.2 Metric - Comprehension Level

The metric assesses if the dashboard is designed in a way that does not require expert knowledge. The use of plain language, clear graphs, and explanations is critical.

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[15] Belinda Bailey, 'Dashboards 101: Best Practices for Developing Great Dashboards' (*Displayr*, 8 December 2020) <https://www.displayr.com/dashboards-101-best-practices-for-developing-great-dashboards/> accessed 21 June 2023.

2.1.2 Information Completeness

Measures whether the dashboard provides a complete view of the subject of assessment.[16] It aims to evaluate if the presented information covers all critical aspects and dimensions related to the topic, enabling users to gain a thorough understanding of the subject matter.

For example, in the context of evaluating the quality of life in prisons, the criterion of information completeness would involve assessing whether the dashboard provides a comprehensive view of the various aspects related to prison conditions and the well-being of inmates. This information needs to be assessed both in terms of their breadth and depth. In particular, the breadth metric would assess whether the dashboard includes data about: physical infrastructure, safety and security, healthcare and medical services, rehabilitation and education programs, social and recreational activities. The depth criterion would assess the extent to which this information is analysed or explained.

2.1.2.1 Metric - Breadth of Information

The metric assesses if the dashboard covers all critical aspects of the information it presents relating to access to justice.

2.1.2.2 Metric - Depth of Information

The metric assesses if the dashboard provides enough detail for each aspect to give users a comprehensive understanding.

2.2 Visual Representation

The *Visual Representation* category in the evaluation report focuses on assessing the effectiveness of how a dashboard visually presents information to users. This category comprises three evaluation criteria.

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[16] Ricardo Matheus, Marijn Janssen and Devender Maheshwari, 'Data Science Empowering the Public: Data-Driven Dashboards for Transparent and Accountable Decision-Making in Smart Cities' (2020) 37 Government Information Quarterly 101284 <https://www.sciencedirect.com/science/article/pii/S0740624X18300303> accessed 21 June 2023.
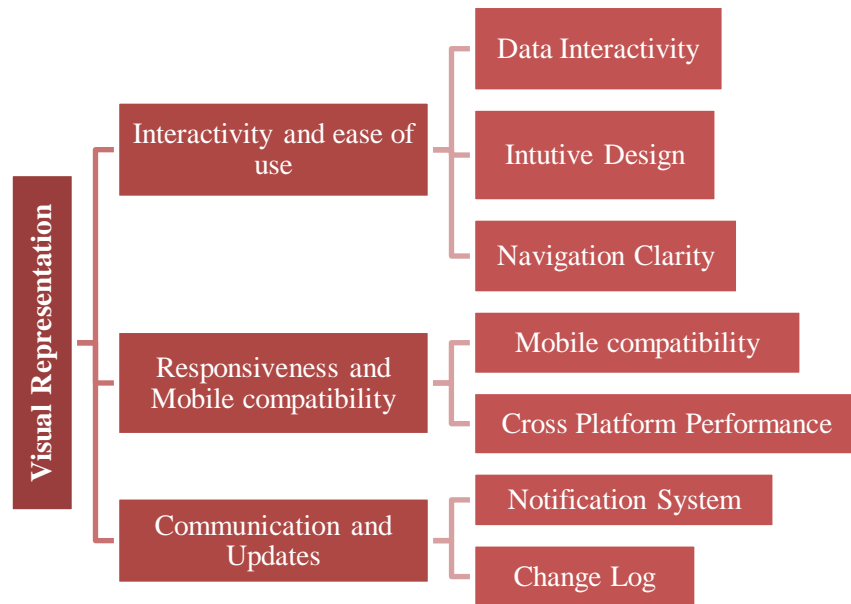
- The first criterion, *Interactivity and Ease of Use* emphasises the importance of engaging users and enabling them to interact with the data, while recognising the significance of intuitive design and easy navigation on a dashboard. The chosen metrics, *Data Interactivity* was selected to ensure that users can filter and adjust parameters to better understand the information. The metrics of *Intuitive Design* **and** *Navigation Clarity* were chosen to assess if the dashboard is designed in a way that allows users to easily find the information they seek. Clear and understandable navigation structures, menus, and search features contribute to a user-friendly experience.

- The second criterion, *Responsiveness and Mobile Compatibility* addresses the importance of a dashboard's performance on different devices and screen sizes in order to evaluate the operational access to justice of the dashboard. The metrics of *Mobile Compatibility* **and** *Cross-Platform Performance* were selected to ensure that the dashboard is easily viewable and fully functional on mobile devices and performs consistently across various operating systems. This ensures accessibility and a seamless user experience across different platforms.

- The third and final criterion, *Communication and Updates* underscores the need for effective communication regarding updates and changes in the dashboard. The metrics of *Notification System* **and** *Change Log* were chosen to assess if the dashboard has a system to notify users about significant updates and if there is a clear record of changes for

transparency and tracking purposes. The inclusion of a feedback system allows users to provide input, report issues, and make suggestions, promoting a user-centric approach.

By including these evaluation criteria, the report aims to evaluate how well the dashboard engages users, provides ease of use and navigation, ensures responsiveness and mobile compatibility, and effectively communicates updates. These criteria were selected to enhance the user experience, encourage user interaction and feedback, and ensure that the dashboard is accessible, functional, and adaptable to users' needs.

2.2.1 Interactivity and Ease of Use

This criterion assesses the level of user engagement and the ability to interact with the data on the dashboard.[17],[18] It also evaluates the user-friendliness of the dashboard's design and the ease with which users can navigate through it.[19]

2.2.1.1 Metric - Data Interactivity

The metric assesses if users are able to filter data, and adjust parameters to understand the information better.

2.2.1.2 Metric - Intuitive Design

 The metric assesses if the dashboard is designed to make it easy for users to find the information they seek. This metric may involve: 1) *Task Completion*: Evaluate if users can successfully accomplish their intended tasks without confusion or excessive effort. Consider whether they can quickly locate and utilise the necessary features or functions to achieve their objectives. 2)*Consistency and Familiarity:* Evaluate the consistency of design elements, such as icons, buttons, and menus, throughout the dashboard. Assess if these elements adhere to familiar patterns and conventions, making it easier for users to understand their purpose and functionality. For example, the existence of a magnifying glass icon signifies a search function.

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[17] Echeverria (n 16)

[18] Mario Nadj, Alexander Maedche and Christian Schieder, 'The Effect of Interactive Analytical Dashboard Features on Situation Awareness and Task Performance' (2020) 135 Decision Support Systems 113322 <https://www.sciencedirect.com/science/article/pii/S0167923620300774> accessed 21 June 2023.

[19] Vlad Derdeicea, 'Designing Memorable Dashboards' (*Medium*, 21 March 2023) <https://uxdesign.cc/designing-memorable-dashboards-4a4fc2d829a4> accessed 21 June 2023.

2.2.1.3 Metric - Navigation Clarity

The metric assesses if the navigation structure (menus, search features, buttons) is clear and understandable. This metric may involve: 1) *Information Hierarchy and Organisation:* Assess if the hierarchy and grouping of data align with users' mental models and expectations. A well-organised dashboard should present information in a logical and intuitive manner, allowing users to easily locate and comprehend the desired content. 2) *Visual Clarity and Signposting:* Assess if important information, actions, or navigation paths are visually emphasised, allowing users to quickly identify and understand their significance. Clear labels, tooltips, and visual cues can help guide users and facilitate intuitive interactions.

2.2.2 Responsiveness and Mobile Compatibility

The criterion assesses the dashboard's performance on various devices and screen sizes.[20]

2.2.2.1 Metric - Mobile Compatibility

The metric assesses if the dashboard is easily viewable and fully functional on mobile devices.

2.2.2.2 Metric - Cross-Platform Performance

The metric assesses if the dashboard performs consistently across various operating systems (iOS, Android, Windows, Mac, etc) and internet browsers (Chrome, Edge, Safari, etc).

2.2.3 Communication and Updates

The criterion measures how well the dashboard communicates updates and changes to its users.[21]

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[20] 'Dashboards – Government Analysis Function' <https://analysisfunction.civilservice.gov.uk/policy-store/top-tips-for-designing-dashboards/> accessed 21 June 2023.

[21] Mabrouk Chouikri, 'Choosing the Right Data Dashboard to Improve Decision-Making in Your Organization' (*Opendatasoft*, 27 March 2023) <https://www.opendatasoft.com/en/blog/choosing-the-right-data-dashboard-to-improve-decision-making-in-your-organization/> accessed 21 June 2023 ; Ricardo Matheus, Marijn Janssen and Devender Maheshwari, 'Data Science Empowering the Public: Data-Driven Dashboards for Transparent and Accountable Decision-Making in Smart Cities' (2020) 37 Government Information Quarterly 101284 <https://www.sciencedirect.com/science/article/pii/S0740624X18300303> accessed 21 June 2023.

The metric assesses if the dashboard has a system to notify users about any significant updates or changes.

2.2.3.2 Metric - Change Log

 The metric assesses if the dashboard has a clear real time record of changes made to the dashboard for transparency and tracking purposes.

2.2.3.3 Metric - Feedback Mechanism

 The metric assesses if the dashboard includes a feedback system that allows users to to report issues and make suggestions.

2.3 Social parameters

The *Social parameters* category was developed to address issues with the dashboards' accessibility that derive from the diverse demographic and cultural landscape of India. The evaluation performed in this category is to be approached to a large extent as a source of best practices and recommendations. This category includes two criteria.
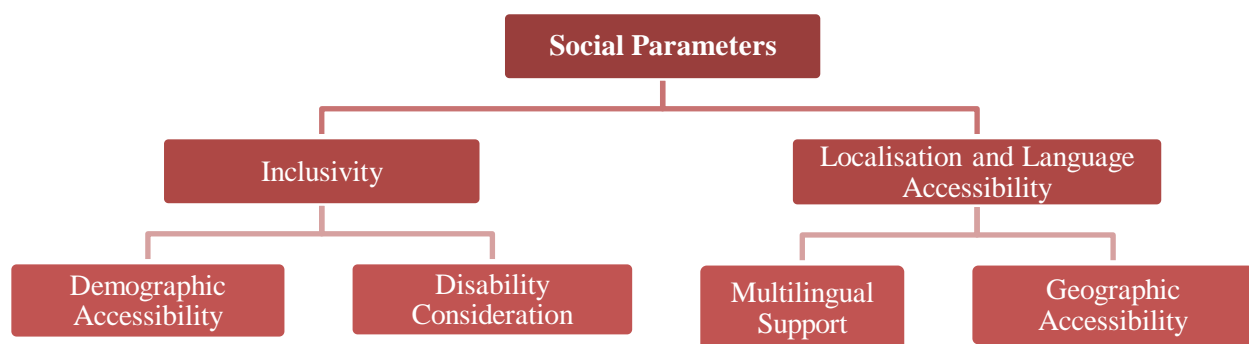
Inclusivity was chosen to ensure that users would be able to interact with a dashboard regardless of their demographics or disabilities. As the dashboards constitute a part of India's justice system's digitisation, the inclusivity dimension of this transformation is of great importance, as without

inclusivity features, it could increase digital marginalisation. First, **the** *Demographic Accessibility Metric* was developed to measure the universality of the means of communication through which it operates. Acknowledging that although the universal comprehensibility of the dashboards' content across all demographics is unachievable and that interacting with and accessing the dashboards requires some degree of digital competency, it should strive to reduce the barriers to engaging with the dashboards for as many individuals as feasible. The evaluation of the comprehensibility of the content-related design choices can be based on simplicity and universality, i.e., to what extent these choices evoke similar associations across various users. The second metric, *Disability Consideration,* was developed to assess whether the dashboards are suitable for use by individuals with disabilities, which can be achieved by enabling accessibility plugins on a website.

Localisation and Language Consideration were chosen to address the disparities in access to information related to potential geographic restrictions and the lack of multilingual support, which may constitute a barrier to understanding the content of dashboards. The *metric - Multilingual Support* takes into consideration that English or Hindi may not be the first language of some of the users interacting with the dashboards, and technological solutions such as the use of translation plugins could increase access to information. *The Geographic Accessibility* Metric was developed to evaluate the access to the dashboards from different locations, including rural areas, and whether the display of the content is in any way affected by the location's change.

By including these criteria, the report aims at evaluating whether the dashboards can be used and comprehended by various user groups, reflecting the diverse cultural and demographic landscape of India. The overarching objective of these criteria is to increase the accessibility of public information and strive to remedy the risk of digital marginalisation.

2.3.1 Inclusivity

This criterion assesses whether the dashboard is designed in a way that allows its users, regardless of their demographic, geographic location, educational background, or physical capabilities, to understand and interact with it.[22]

2.3.1.1 Metric - Demographic Accessibility

The metric assesses the extent to which the visual representations, e.g., icons or the content of the dashboards, can be comprehended by various demographics (youth, adults, elderly, diverse languages, diverse educational or socio-economic backgrounds). The comprehensibility of information can be assessed by the simplicity and clarity of the information or the way it is presented, as well as whether it evokes similar associations across various demographics. This metric relates to the *Intuitive design* metric, but it accentuates more the universality and comprehensibility aspects of the design choices related to the content of the dashboard across various demographics.

2.3.1.2 Metric - Disability Consideration

The metric assesses if the dashboard is accessible to individuals with disabilities (visual, hearing, physical, and cognitive impairments) per the Web Content Accessibility Guidelines (WCAG).[23]

2.3.2 Localisation and Language Accessibility

The criterion measures the degree to which the dashboard caters to India's diverse linguistic landscape and whether they can be accessed from various locations.[24]

2.3.2.1 Metric - Multilingual Support

The metric assesses if the dashboard is available in various languages across India.

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[22] Philippe Barzin, 'Why WCAG Guidelines Are Vital for Creating Effective Dashboards' (*CoEnterprise*, 25 May 2023) <https://www.coenterprise.com/blog/why-wcag-guidelines-are-vital-for-creating-effective-dashboards/> accessed 21 June 2023.

[23] 'Web Content Accessibility Guidelines (WCAG) 2.1' <https://www.w3.org/TR/WCAG21/> accessed 21 June 2023.

[24] 'Localization In Dashboards' (*USEReady*, 17 October 2022) <https://resources.useready.com/blog/localization-in-dashboards/> accessed 21 June 2023.

2.3.2.1 Metric - Geographic Accessibility

The metric assesses if the dashboard is accessible and functional across all regions of India, regardless of urban or rural locations and whether there are any changes in the way information is displayed across the regions.

2.4 Methodology principles

This category revolves around methodological considerations. It sets a methodological standard that focuses on ascertaining the integrity, security, reliability, and impact of dashboards in the context of access to justice.
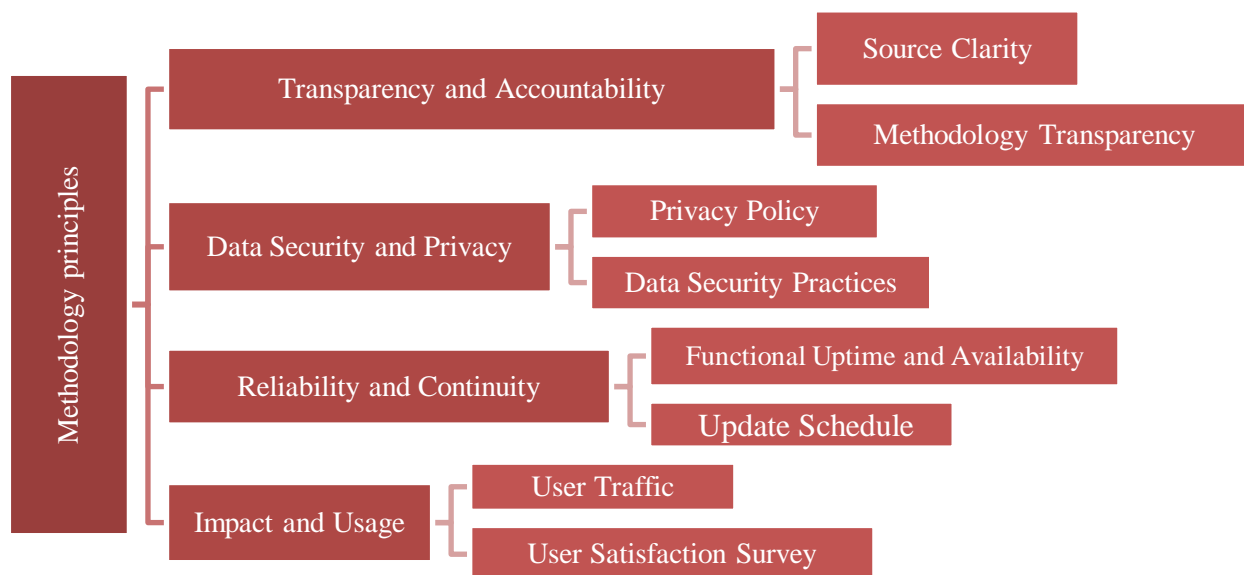
***Transparency and Accountabilit*y** ensure that the dashboard clearly outlines its data sources and methodologies and provides up-to-date and accurate data. The source's clarity and methodology transparency metrics evaluate the data sources' lucidity and whether the dashboard allows for data filtering and presentation. Data recency and accuracy further assess the currency and accuracy of the data presented, enhancing the overall trustworthiness of the dashboard.

Data Security and Privacy scrutinises the dashboard's commitment to protecting user privacy and securing data effectively. It looks to see if there is a consciously displayed privacy notice explaining the processing activities on the dashboard. Security focuses on whether the website has a minimum encryption requirement to protect visitors.

Reliability and Continuity is designed to gauge the dashboard's consistent availability, functionality, and update regularity. Metrics such as Uptime and Availability, Functional Consistency, and Update Schedule allow a thorough examination of the dashboard's performance, ensuring that users can always access a fully functional, updated platform.

Impact and Usage focuses on the reach and effectiveness of the dashboard in improving access to justice. Metrics like User Traffic and the user satisfaction survey combine to assess regular usage statistics and user feedback, which allows visibility into the dashboard's effectiveness.

The methodology principle aims to evaluate dashboards' integrity, security, transparency, reliability, and impact, ensuring that they function effectively as tools for enhancing access to justice while being user-friendly and secure.

2.4.1 Transparency and Accountability

The criteria evaluate whether the dashboard clearly outlines its sources and methodologies and if it provides up-to-date and accurate data.[25][26]

2.4.1.1 Metric - Source Clarity

The metric assesses if each piece of data has a clearly defined source. In addition, the metric assesses if there is a mechanism in place to verify the accuracy of the data presented. The metric will use the information disclosed about the source(s) of the data provided on the dashboard. It will also ascertain whether there is information detailing the frequency of data updates.

2.4.1.2 Metric - Methodology Transparency

The metric assesses if the methods used to gather, filter, and present the data are explained in accessible language. This can be measured by the simplicity of the information presented and how flexible it is to filter data on the dashboard.

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[25] Asmaa Abduldaem And Andy Gravell, 'principles For The Design And Development Of Dashboards: Literature Review' (2019) 1314 <Https://Www.Ocerints.Org/Intcess19_e-Publication/Papers/412.Pdf>

[26] Ben Shneiderman, Catherine Plaisant and Bradford W Hesse, 'Improving Healthcare with Interactive Visualization' (2013) 46 Computer 58.

2.4.2 Data Security and Privacy

The criterion evaluates whether the dashboard respects user privacy and secures data effectively.

2.4.2.1 Metric - Privacy Policy

The metric assesses if the dashboard has a clear, easily accessible privacy policy that respects users' rights. This is verifiable by searching for the privacy notice on the website. It is also recommended to check if there is a privacy notice if the dashboard refers to other data sources that are publicly available.

2.4.2.2 Metric - Data Security Practices

The metric assesses if the dashboard implements secure data practices, including encryption and server protocols. The implementation of encryption can be verified by looking for the padlock sign in the website address bar. However, a tool like urlscan[27] and webkoll[28] is recommended to empirically verify if there is encryption of the internet traffic to the dashboard.

2.4.3 Reliability and Continuity

The criterion evaluates if the dashboard is consistently available, functional, and reliable.[29][30]

2.4.3.1 Metric - Functional Uptime and Availability

The metric assesses if the dashboard is always available for access, barring scheduled maintenance. This will be assessed by checking if the site is available at the relevant time. Also, The metric assesses if all dashboard features work as intended consistently, without crashes or glitches. In

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[27] urlscan.io, 'URL and Website Scanner - Urlscan.io' (*Urlscan.io* 2023) <https://urlscan.io/> accessed 10 July 2023.

[28] Dataskydd.net. *Analyze | Webbkoll - Dataskydd.Net*. https://webbkoll.dataskydd.net/. Accessed 10 July 2023.

[29] Muhittin Sahin and Dirk Ifenthaler, 'Visualizations and Dashboards for Learning Analytics: A Systematic Literature Review' in Muhittin Sahin and Dirk Ifenthaler (eds), *Visualizations and Dashboards for Learning Analytics* (Springer International Publishing 2021) <https://doi.org/10.1007/978-3-030-81222-5_1> accessed 21 June 2023.

[30] '6 Benefits of an Interactive Dashboard over a Static One' (11 April 2023) <https://www.quanthub.com/what-are-the-benefits-of-an-interactive-dashboard-over-a-static-one/> accessed 21 June 2023.

addition, it is recommended to use tools like ISITWP[31] and Donwninspector[32] to track the number of outages.

2.4.3.2 Metric - Update Schedule

The metric assesses the frequency and regularity of updates to the dashboard, including new data, feature enhancements, and bug fixes. One way to verify this is by checking the version history of the dashboard, if available. This should record all updates, including new data, feature enhancements, and bug fixes. Another way is to check if there are announcements, user feedback, and comments, if any are available, which may provide insight into the timing and nature of changes.

2.4.4 Impact and Usage

The criterion evaluates whether the dashboard is being used and if it is positively impacting access to justice.[33]

2.4.4.1 Metric - User Traffic

The metric assesses regular usage statistics to gauge the reach of the dashboard. This will check if the dashboard provides information about the number of users/visitors. In the alternative, tools like Hypestat[34] can be used to track analytics about visitors to the dashboard.

2.4.4.2 Metric - User Satisfaction Survey

This metric examines the regular feedback received from users to gauge the value and practicality of the dashboard in facilitating their comprehension and access to justice. However, it is pertinent to note that the relevance of this data hinges on the availability of such user surveys. If such a

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[31] 'Free Website Uptime Checker - Easily Check Your Website Availability Status - IsItWP' (*IsItWP - Free WordPress Theme Detector*19 February 2018) <https://www.isitwp.com/uptime-checker/> accessed 10 July 2023.

[32] 'Is It down for Everyone or Just Me?' (*Downinspector*2023) <https://downinspector.com/> accessed 10 July 2023.

[33] Ricardo Matheus, Marijn Janssen and Devender Maheshwari, 'Data Science Empowering the Public: Data-Driven Dashboards for Transparent and Accountable Decision-Making in Smart Cities' (2020) 37 Government Information Quarterly 101284 <https://www.sciencedirect.com/science/article/pii/S0740624X18300303> accessed 21 June 2023.

[34] 'Web Statistics and Analysis | HypeStat' (*Hypestat.com*2023) <https://hypestat.com/> accessed 10 July 2023.

survey is non-existent or the results are not publicly accessible, this metric may not be factored into the assessment.

3. APPLICATION OF THE EVALUATION CRITERIA

In this section we will demonstrate the application of the evaluation criteria based on two dashboards that foster access to justice. The first one refers to the National Prison Information Portal (NPIP) that presents statistical data of various prisons in India.[35] The second one refers to the National Judicial Data Grid (NJDG) that presents information regarding pending and disposed cases before the High Court, the District Court or Taluka Courts.[36]
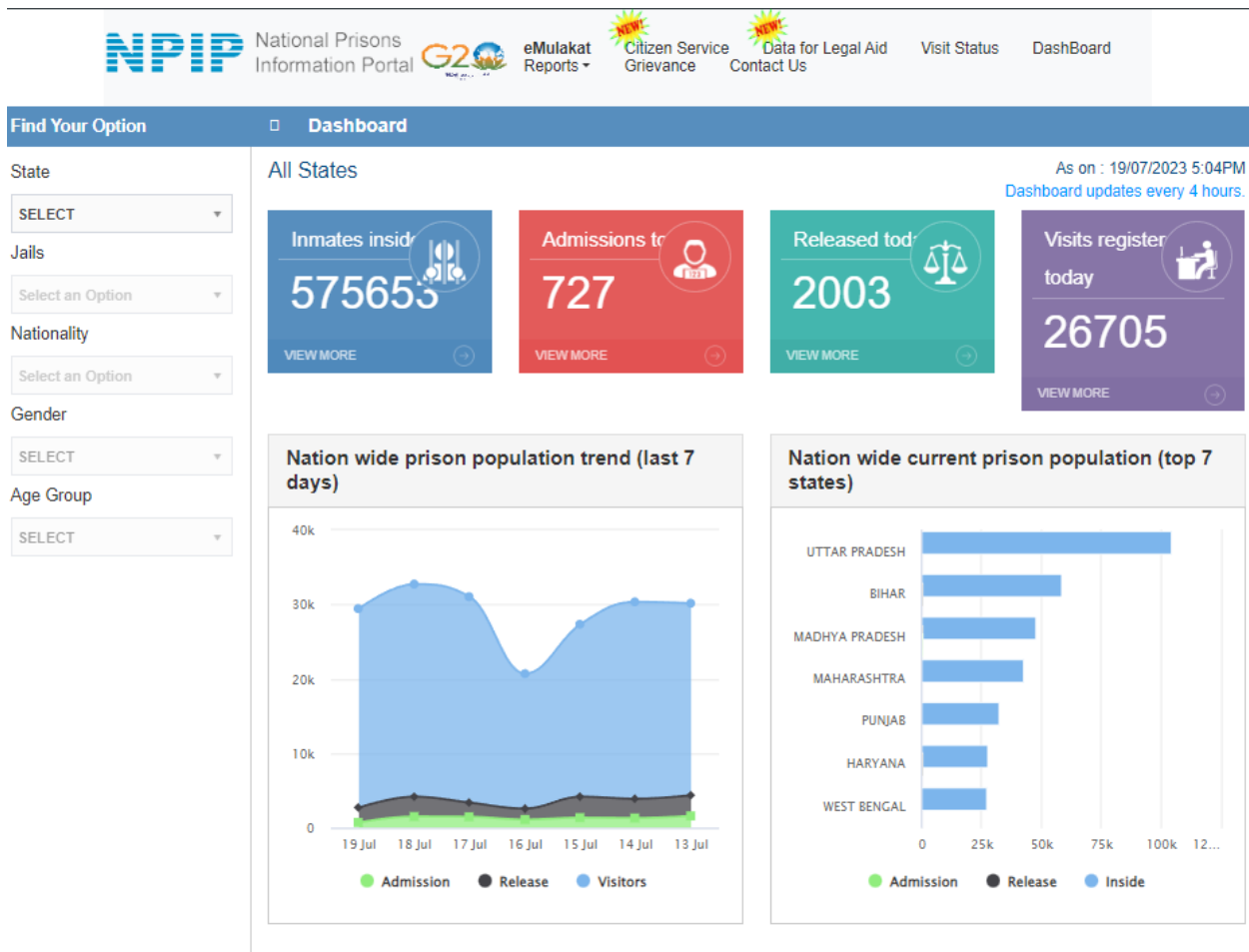
3.1 National Prison Information Portal (NPIP)[37]

The National Prison Information Portal (NPIP) displays a dashboard incorporating data regarding national prison population, and registered visits. In particular, the dashboard presents 4 main information squares exhibiting, in order, the number of inmates currently incarcerated, the real time admissions and releases and the number of real time registered visits. The information squares follow two graphs, a line graph presenting the national prison population trend of the last 7 days, and a bar graph presenting the national current prison population in the top 7 states.

The dashboard can be configured by selecting filters available on the left of the website that include selecting the state, jail, nationality, gender and age group. The dashboard informs the user of the day and time of its last data update and while also indicating that updates occur every four hours.

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[35] About us, https://eprisons.nic.in/public/About accessed 13 July 2023

[36] Disclaimer, https://njdg.ecourts.gov.in/hcnjdgnew/?p=main/disclaimer accessed 13 July 2023

[37] National Prison Information Portal (NPIP), https://eprisons.nic.in/public/DashBoard accessed 13 July 2023

Picture 1: Dashboard of the National Prison Information Portal (NPIP)

3.1.1 Content

In this section we will assess the effectiveness of the content of the NPIP's dashboards applying the two evaluation criteria and their corresponding metrics.

Firstly, in order to assess *Relevance and Comprehensibility*, we evaluate whether information relating to the prison system is communicated in a manner that is understandable for citizens. The objective of the website is to communicate statistical data of various prisons in the country with a purpose of providing information to the citizens and facilitating them the activities related to the prison system such as visit requests.[38] Information included in the dashboards covers various categories: the number of inmates currently incarcerated, the real time admissions and releases and

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[38] About us, https://eprisons.nic.in/public/About accessed 16 July 2023

the number of real time registered visits, a current number and a trend regarding the nation wide prison population. The data presented are relevant to the dashboard's objective as it provides vital statistics on inmates population and demographic for public information.

Concerning the comprehensibility of data, they are presented in a generally clear manner. However, the meaning of the titles encompassing different categories of data presented by the dashboard is not explained. We also notice linguistic differences in the title accompanying the data. For instance, when clicking on the information square "Inmates inside", we are presented with the title of "Details of inside prisoners". The use of synonyms such as 'inmates' and 'prisoners' increases the comprehensibility level, however this technique is not consistent throughout the website. For example, when clicking the information square "Admissions Today", we are presented with even less information, as the secondary title obscures the time period that the data refer to, by replacing the title "Admissions Today" by "Admission". Thus, this criterion is partially met.

When assessing the completeness of information, the breadth of information's aspect is fulfilled as the dashboard presents a variety of data covering all critical aspects regarding national prison population, and registered visits categorised in accordance with various demographic parameters and prison facilities locations. The dashboard includes all relevant information that a user can reasonably expect to receive when examining such a dashboard. Regarding the depth of information the 'view more' function contributes to extracting more information by allowing users to access statistics concerning different States. This feature facilitates the comparative analysis of data, enabling users to correlate information and gain a better understanding of the subject. Therefore this criterion is fulfilled.

Furthermore, the information included in the dashboard are presented in various correlation forms in order to extract as much information as possible. Therefore this criterion is met.

3.1.2 Visual Representation

In this section we will assess the effectiveness of the visual representation of the NPIP's dashboards applying the four evaluation criteria and their corresponding metrics.

Firstly, in order to assess *Interactivity and Ease of Use*, we evaluate whether users are able to filter data and assess the intuitiveness and ease of the dashboard's design. To start with, the dashboard incorporates the option of configuring information by applying filters defining the State or origin of data, the jail of interest, the nationality, gender and age group. Furthermore, the user is able to interact with the information squares, clicking on them to reveal more information. The graphs also present interactive elements. The line graph allows the user to hover over the line points to reveal the exact number of visitors and the number of admission and releases in the last seven days, while the bar graph by applying the same technique reveals the same information classified according to the top 7 States. The user is able to select whether he/she prefers to display all information lines/ bars at the same time or alternating.

Adding to the dashboard's interactivity, the dashboard is composed of familiar elements. The information squares and graphs constitute common features of a dashboard's design. Therefore the user is able to navigate with ease and interact effectively with the information elements. The position of an arrow icon accompanied by the phrase "view more" at the bottom of the information squares invites the user to interact with them. Furthermore, the placement of the filters on the left side of the website facilitates the user to explore further the data. Adding to its intuitive design, the dashboard is organised in a very clear way. It positions easily comprehensible information squares at the top of the website, signposting each of them in order to indicate the meaning of the number that follows and then presents the same categories of data in two graphs, one illustrating a trend in admissions, releases and visitation in the last 7 days and the second presents the number of admissions, releases and prison population by State covering the top 7 states. Therefore the criterion of *Interactivity and Ease of Use* is also satisfied.

The second criterion relates to *responsiveness and mobile compatibility*. After loading the website on a mobile android device (using Chrome), we ascertain that it is responsive and compatible. The same goes for an iOS device using Safari mobile. The dashboard adjusts well to the different devices, adapting the size of the information squares and graphs accordingly and presenting them in a scroll down form. In contrast, in a desktop device, the dashboard is presented in a single page without the need to scroll down. Therefore this criterion is met.

The last criterion is about *Communication and updates*. The dashboard informs the user regarding the update of information by a permanent message at the top right corner of the website. However,

the dashboard does not possess a function that retains old versions of data. Therefore the user is not able to search through a history of data, he/she only has access to real-time data. Also, the website includes the functionality of submitting grievances therefore users are able to provide feedback, report issues and make suggestions. This criterion is partially met.

3.1.3 Social Parameters

Inclusivity looks to assess how inclusive the dashboard is in terms of its accessibility. Demographic accessibility assessment of the dashboard reveals that it is accessible to a very large section of the society. Although mainly available in English language, which may exclude a section of the society, the dashboard is presented using visual and textual elements that are easy to understand (*See Picture 1*). The disability consideration does not meet the threshold for accessibility under the WCAG for those with visual impairments.

Localisation and language accessibility does not show the diverse nature of the languages spoken in the country, as the dashboard is only available in English. This limitation restricts the usability and effectiveness of the dashboard for non-English speakers in the country. However, it is important to note that this evaluation does not incorporate the second metric: geographical accessibility. The reason is that our assessment was conducted in the Netherlands, and we lack the necessary data to determine whether the dashboard is accessible throughout the entirety of India. Hence, the evaluation of geographical accessibility remains outside the scope of this particular study.

3.1.4 Methodology Principles

The dashboard's transparency and accountability evaluation sheds light on its displayed data's provenance. The dashboard allows users to filter data by various parameters such as state, gender, nationality, prison, and age group. Furthermore, it provides a detailed breakdown of prison inmates' status, encompassing those admitted, released, currently incarcerated, parole violators, and absconders. The information presented is sourced from the nationwide Prison Management Information System, which may bolster the credibility, update frequency, and reliability of the data presented on the dashboard. This may suggest a level of accuracy and reliability in the information displayed. However, it is outside the scope of this report to verify the accuracy and completeness

of the data represented. Moreover, the dashboard's flexibility extends to filtering data along various levels and parameters, providing users with a more customised and relevant data viewing experience. For example, data can be filtered to gain visibility into age group, gender, nationality of inmates, and the specific jail where they are held. Including data on recent prison admissions adds to the practicality and pertinence of the information displayed and empowers users by providing insights into admission trends over various parameters. This could include insights into the predominating age groups or the regularity of admittance based on nationality, hence underscoring the relevance of recent inmate admissions data to its users.

Data security and privacy are also of paramount importance to the data provided by the dashboard. The dashboard contains a privacy notice explaining the processing activities on the dashboard. The evaluation did not examine the adequacy of the information provided by the notice. The assessment of the dashboard on urlscan and webkoll shows that it encrypts information between the user and the website, which guarantees the confidentiality, integrity, and availability of the data. However, the dashboard does not include a content security and referrer policy which may cause cross-site scripting (XSS) vulnerabilities.

The reliability and continuity metrics determine whether the dashboard consistently operates predictably and is perpetually accessible. Upon evaluating the dashboard's uptime and availability via DownInspector and ISTWIPS, it was observed that, as of July 7, 2023, there was no record of recent downtime. This underscores the admirable stability and availability of the dashboard. However, the dashboard lacks crucial supportive information, such as an updated schedule ,space for announcements, feedback or comment. These elements could provide valuable insights into the timing and nature of modifications or updates implemented on the dashboard. The absence of these details potentially affects the overall user experience and their perception of the system's reliability. Although, the dashboard does provide a feature that allows feedback and to raise complaints. This option could contribute to identifying user needs and enhancing the reliability of the dashboard. It should be noted, though, that the feedback mechanism seems to be oriented more towards gathering insights about the inmates' experiences rather than focusing on the experiences of the dashboard's users.

Lastly, the impact and usage metrics evaluate the degree to which the dashboard's content is employed to further the goals of access to justice. According to Hypestats, a platform that monitors

internet traffic, the dashboard receives an average of 11.3 thousand visitors daily, culminating in approximately 343.6 thousand monthly visitors.[39] However, it is noteworthy that the dashboard lacks a user mechanism to offer feedback or suggestions. Furthermore, the existing feedback system appears to prioritise obtaining insights about the inmates' experiences over capturing the user experiences related to the dashboard.

Summary Table:

		METRIC	FINDINGS (NPIP)
CONTENT	Relevance and Comprehensibility	Content Relevance	Satisfied
		Comprehension level	Partially satisfied
	Information Completeness	Breadth of Information	Satisfied
		Depth of Information	Satisfied
VISUAL REPRESENTATION	Interactivity and ease of use	Data interactivity	Satisfied
		Intuitive Design	Satisfied
		Navigation Clarity	Satisfied
	Responsiveness and mobile compatibility	Mobile compatibility	Satisfied
		Cross Platform Performance	Satisfied
	Communication and updates	Notification system	Satisfied
		Change log	Not satisfied

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[39] 'Eprisons.nic.in - FAQ' (*Hypestat.com* 2023) <https://hypestat.com/info/eprisons.nic.in > accessed 14 July 2023.

| SOCIAL PARAMETERS	Inclusivity	Demographic Accessibility	Satisfied
		Disability Consideration	Not Satisfied
	Localization and Language consideration	Multilingual support	Not Satisfied
		Geographic accessibility	Could not be ascertained.
METHODOLOGY PRINCIPLES	Transparency and Accountability	Source clarity	Satisfied
		Methodological Transparency	Satisfied
	Data Security and Privacy	Privacy Policy	Satisfied
		Data Security Practices	Partially Satisfied
	Reliability and continuity	Functional uptime and availability	Satisfied
		Update Schedule	Not Satisfied
		Impact and usage	Satisfied
	User Traffic	User Satisfaction Survey	Not Satisfied

3.2 National Judicial Data Grid (NJDG)[40]

The National Judicial Data Grid (NJDG) provides a comprehensive overview of India's judicial system, showcasing extensive data on the various court cases filed across different courts. It offers insights into the characteristics of these cases and the duration of their disposal. In addition, the NJDG meticulously records the details of both pending and disposed cases. It further demonstrates

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[40]National Judicial Data Grid (NJDG), https://njdg.ecourts.gov.in/hcnjdgnew / accessed 13 July 2023

an appreciation for diversity and inclusivity by revealing demographic information about the litigants approaching the courts to portray their representation. For instance, it considers cases filed by specific groups, such as women and senior citizens.

Moreover, the dashboard has highly flexible functionality, allowing users to refine their search through its robust filtering system. This enables users to gain insights into cases based on their institution date, the court in which they are lodged, the length of time they have spent within the court system, and other case-related specifics. The NJDG also delivers data on the number of cases instituted and disposed of, indicating which court has been responsible for their administration. To further enhance comprehension and analysis, it presents a visual breakdown of the nature of the cases, thus providing a more intuitive and accessible means to understand the complex legal landscape.
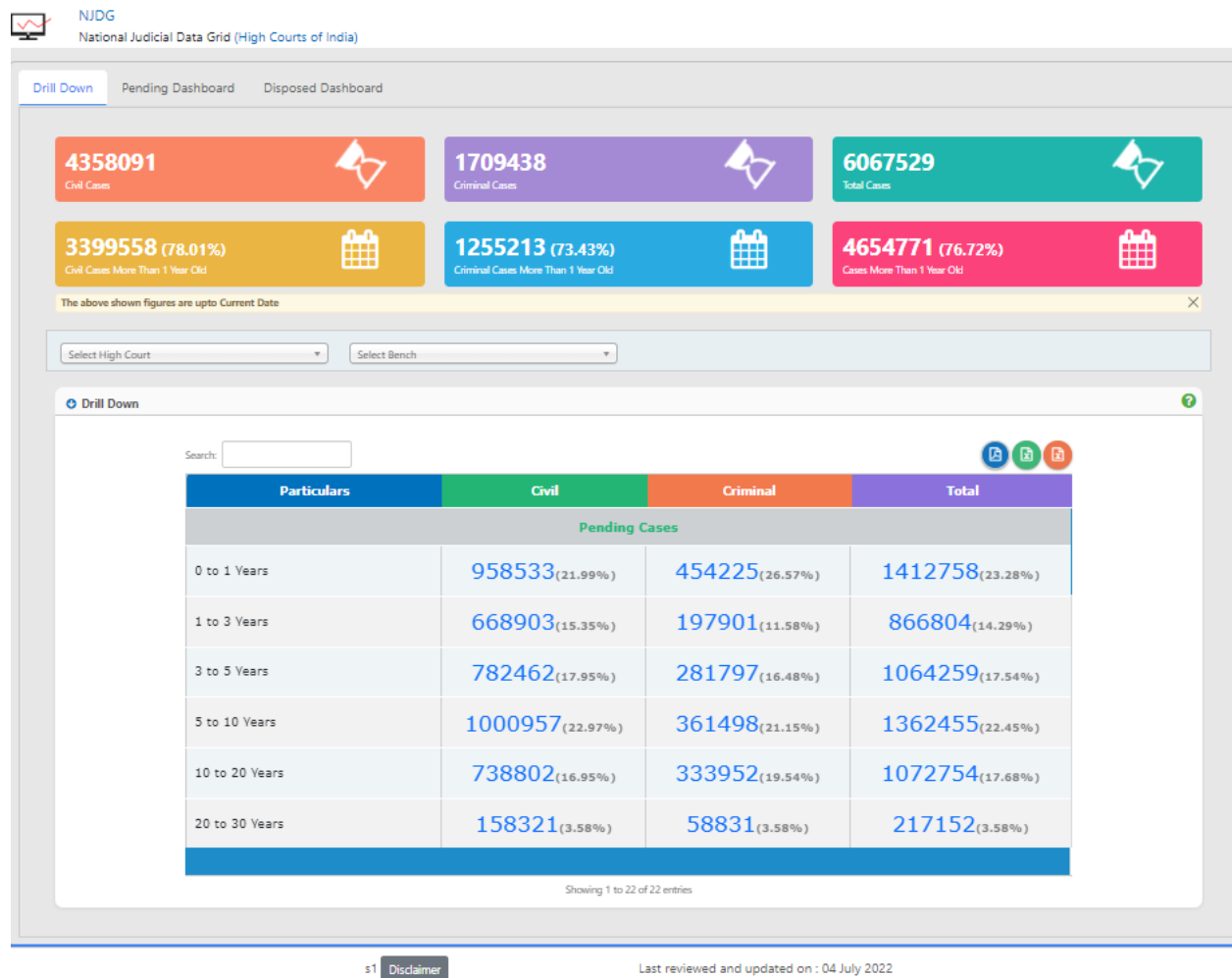
Picture 2: Dashboard of the National Judicial Data Grid (NJDG)

3.2.1 Content

In this section we will assess the effectiveness of the content of the NJDG's dashboards applying the two evaluation criteria and their corresponding metrics.

Firstly, in order to assess *Relevance and Comprehensibility*, we evaluate whether the dashboard effectively communicates information related to access to justice in a manner that the ordinary citizen can understand. The objective of the website is to present information regarding pending or disposed cases before the High Court or District Court or Taluka Courts.[41] The content of the website includes information regarding the number of civil and criminal cases, their duration, type of case and pendency of trial as well as information regarding disposed cases, such as their number, type of case, pendency of trial, reason for disposal and time of disposition. All this information pertains to the objective of the dashboard of informing the public regarding pending or disposed cases before the High Court. However, in terms of comprehensibility, some of the data incorporated into the dashboard are expressed using legal terminology, therefore they require expert legal knowledge in order to be understood. This criterion is partially met.

As far as the information completeness is concerned, the dashboard presents a variety of data covering all critical aspects of pending and disposed cases before the High Courts. The dashboard includes all relevant information that a user can reasonably expect to receive when examining such a dashboard. Furthermore, the information included in the dashboard is presented in various correlation forms in order to extract as much information as possible. Therefore this criterion is met.

3.2.2 Visual Representation

In this section we will assess the effectiveness of the visual representation of the NJDG's dashboards applying the four evaluation criteria and their corresponding metrics.

Firstly, in order to assess *Interactivity and Ease of Use*, we evaluate whether users are able to filter data and assess the intuitiveness and ease of the dashboard's design. To start with, the dashboard incorporates the option of configuring information by applying filters selecting the High Court and

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[41] Disclaimer, https://njdg.ecourts.gov.in/hcnjdgnew/?p=main/disclaimer accessed 14 July 2023

Bench of interest. Furthermore, there is also some level of interaction with the dashboard. The information squares, at the top part of the website, are not interactive, however the user is able to interact with the drill down of the pending cases. By clicking on the number of cases, categorised by civil criminal and total, as well as by the number of years it has been pending, the user can reveal more information. In contrast to the "Drill down" section, the sections "Pending Dashboard" and "Disposed Dashboard" present even more interactivity. The information blocks on these sections remain noninteractive, however, the user is able to adjust the data on the graphs that follows by hovering over them. In particular, we observe that by hovering the mouse over the pie chart "Matter Type Disposal Pie Chart", the data on the bar chart "Case Petition Case Type Wise Disposal" change. This pattern of action is implemented to all coupled graphs, that are placed side to side to indicate their correlation.

Adding to the dashboard's interactivity, the dashboard is composed of familiar elements. The information squares and graphs constitute common features of a dashboard's design. Therefore the user is able to navigate with ease and interact effectively with the information elements. While hovering over the interactive elements in the "Drill Down" section, the icon of the mouse changes from an arrow to a hand to indicate interactivity. However, this is not the case for the rest of the sections. Furthermore, the placement of the filters under the information squarers, in the middle of the website facilitates the user to explore further the data. Adding to its intuitive design, the dashboard is organised in a very clear way. It positions easily comprehensible information squares at the top of the website, signposting each of them in order to indicate the meaning of the number and then follows with granular information in the form of charts. The charts have clear indicators of selection, turning blue when selected, accompanied with the type of the data presented. According to the above, the criterion of *Interactivity and Ease of Use* is also satisfied.

The second criterion relates to *responsiveness and mobile compatibility*. After loading the website on a mobile android device (with Chrome browser) and an iOS device (with Safari), we ascertain that both are responsive and compatible, retaining all the information present on the desktop version. The dashboard adjusts well to the different devices, adapting the size of the information squares and graphs accordingly and presenting them in a scroll down form. In contrast, in a desktop device, the dashboard is presented in a single page without the need to scroll down. Therefore this criterion is met.

In terms of *Communication and Updates*, there are several areas where the dashboard falls short in meeting the evaluation criteria. While the dashboard includes a permanent message at the bottom of the website to inform users about the date of the last update, it fails to provide any indication of when the next update will occur. This lack of information creates uncertainty and makes it difficult for users to rely on the dashboard for up-to-date data. Moreover, it is concerning that the last update to the dashboard was on 04/07/2022, and as of the writing of this report on 17/07/2023, no updates have been made for over a year. This significant gap in updates undermines the dashboard's credibility and diminishes its usefulness as an academic resource. Another limitation is the absence of a function that retains old versions of data. As a result, users are unable to access and analyse historical data, limiting their ability to conduct thorough research or track changes over time. The inability to search through a history of data restricts users to solely relying on real-time data, which may not provide a comprehensive understanding of the subject matter. Furthermore, the dashboard lacks a functionality for users to submit grievances, provide feedback, report issues, or make suggestions. This omission prevents users from actively engaging with the dashboard's creators and hampers the potential for collaborative improvement. The ability to provide feedback and report issues is crucial for maintaining the quality and accuracy of the information presented on the dashboard. This criterion is not met.

3.2.3 Social parameters

Social parameters evaluate the inclusion of the user in the system.

Inclusivity examines the demographic accessibility and disability considerations. The dashboard uses a combination of visual and textual representations to depict information, which is in turn displayed in a clear and easily accessible format. It also has provisions for filtering the data based on the user's interests, including gender, age of the case, and whether the case is a civil criminal, among other parameters. The dashboard is also highly flexible, allowing users to refine their search through its robust filtering system. This enables users to gain insights into cases based on their institution date, the court in which they are lodged, the length of time they have spent within the court system, and other case-related specifics. However, it is only available in English language and may pose a barrier for users with limited English proficiency. Also, the use of visual representations may be insufficient for users with visual disabilities. Finally, the dashboard does

not currently meet the threshold of the Web Content Accessibility Guidelines (WCAG) that include consideration for people with disabilities, particularly those with visual disabilities.

Another key performance indicator pertains to localisation and language accessibility. Currently, the dashboard only caters to English-speaking users and does not support the various languages spoken across India. This limitation restricts the usability and effectiveness of the dashboard for non-English speakers in the country. However, it is important to note that this evaluation does not incorporate the second metric: geographical accessibility. The reason is that our assessment was conducted in the Netherlands, and we lack the necessary data to determine whether the dashboard is accessible throughout the entirety of India. Hence, the evaluation of geographical accessibility remains outside the scope of this particular study.

3.2.4 Methodology Principles

The methodology principles evaluate the effectiveness of transparency and accountability, data security and privacy, reliability and continuity, and impact and usage.

Transparency and accountability are essential metrics in this evaluation, confirming that the data collated and processed by the dashboard originates from reliable official sources, such as the national court system. The dashboard offers the public an open platform to access and utilise this data for various purposes, ranging from academic research and education to advancing the judicial system.

Furthermore, the dashboard champions the principles of transparency and public accessibility, permitting an open and inclusive approach to data interrogation. This is facilitated through search and filter features, allowing users to customise their data exploration to match their specific requirements. Notably, the dashboard also provides a timeline feature showcasing the recency of the cases. This indicates that the data is subject to regular updates and maintenance, enhancing its reliability and relevance. In addition, the high degree of flexibility, primarily achieved through its user-friendly interface, further bolsters the dashboard's ease of use and navigability, significantly enhancing the overall user experience.

Also, the dashboard includes a disclaimer that indicates that while the NJDG portal sources its data directly from various courts, inherent limitations and constraints, such as potential connectivity issues, may impact the accuracy and timeliness of the data displayed. Therefore, users are advised

to verify the information with the relevant court authority for complete and accurate details. This caveat plays a significant role in understanding the dashboard's data reliability and necessitates a cautious interpretation of its contents.

Data security and privacy examines the measures taken by the NJDG portal to ensure the protection of users' data. The dashboard does not include a privacy notice. Also, a scan of the dashboard on urlscan and webkoll shows that it encrypts information between the user and the website, which guarantees the confidentiality, integrity, and availability of the data. However, the dashboard does not include a content security and referrer policy which may cause cross-site scripting (XSS) vulnerabilities.

The metrics of reliability and continuity assess whether the dashboard consistently performs as expected and remains accessible at all times. A review of the dashboard's uptime and availability, conducted via DownInspector and ISTWIPS, confirms that as of July 7, 2023, the dashboard experienced no recent downtime, highlighting its commendable stability and availability. However, the dashboard falls short in providing key ancillary information such as an updated schedule, announcements, and space for user feedback or comments, which could otherwise offer valuable insights into the timing and nature of any changes or updates made to the dashboard. This area could impact the overall user experience and understanding of the system's reliability.

Ultimately, the impact and usage metrics assess how the dashboard's content contributes to achieving access to justice objectives. An analysis conducted via Hypestats, an online platform monitoring web traffic, reveals that the dashboard attracts over 121.44 visits daily.[42] Despite this impressive user engagement, the dashboard currently lacks a mechanism for users to offer feedback or suggestions, which could enhance its user experience and effectiveness.

Summary Table:

		METRIC	FINDINGS (NJDG)
CONTENT	Relevance and Comprehensibility	Content Relevance	Satisfied

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[42] 'Ecourts : Home - ECourt India Services Website Stats and Valuation' (*Websiteoutlook.com* 31 July 2019) <http://ecourts.gov.in.websiteoutlook.com/> accessed 14 July 2023.

		Comprehension level	Partially satisfied
	Information Completeness	Breadth of Information	Satisfied
		Depth of Information	Satisfied
VISUAL REPRESENTATION	Interactivity and ease of use	Data interactivity	Partially satisfied
		Intuitive Design	Partially satisfied
		Navigation Clarity	Satisfied
	Responsiveness and mobile compatibility	Mobile compatibility	Satisfied
		Cross Platform Performance	Satisfied
	Communication and updates	Notification system	Not satisfied
		Change log	Not satisfied
SOCIAL PARAMETERS	Inclusivity	Demographic Accessibility	Satisfied
		Disability Consideration	Not Satisfied
	Localization and Language consideration	Multilingual support	Not Satisfied
		Geographic accessibility	Could not be ascertained.
METHODOLOGY PRINCIPLES	Transparency and Accountability	Source clarity	Satisfied
		Methodological Transparency	Satisfied

	Data Security and Privacy	Privacy Policy	Satisfied
		Data Security Practices	Partially Satisfied
	Reliability and continuity	Functional uptime and availability	Satisfied
		Update Schedule	Not Satisfied
		Impact and usage	Satisfied
	User Traffic	User Satisfaction Survey	Not Satisfied

4. LIMITATIONS OF THE REPORT

The report provides valuable insights into using the evaluative criteria developed to assess two selected dashboards focusing on digitising records for prison administration and monitoring cases across different courts within the Indian Justice System. However, it has certain limitations, and we must highlight these to ensure a comprehensive understanding of the report's findings and the subsequent implications.

Firstly, the report predominantly focuses on the objective parameters of these dashboards. These parameters, such as the number of admissions, capacity, releases, and specific case details, can be quantified and directly measured. Although these objective parameters are undoubtedly significant, the exclusion of subjective criteria narrows the scope of the evaluation. Subjective criteria, such as user experience, perceived effectiveness of the justice system, and the social impact of decisions, are equally pertinent to understanding the whole picture. However, these factors were not evaluated due to limitations in the report's scope or because these elements required a more comprehensive data set than was available at the time of the study.

Furthermore, the report lacked ongoing evaluation metrics. A successful dashboard conveys information effectively and should provide a mechanism to understand how it is being utilised and its impact. This report needed to integrate regular user traffic statistics and satisfaction surveys,

which could provide critical insights into the usability and efficacy of the dashboards in question. These elements are essential to identifying any issues or inefficiencies that users may face and gauging how effectively the dashboard is aiding stakeholders in making informed decisions. Lastly, the report did not conduct any periodic dashboard impact assessments. Such assessments are vital to understanding the real-world effects of the dashboards on improving access to justice over time. These assessments are necessary to appreciate the broader implications and benefits that these dashboards may bring about. Moreover, without such impact assessments, there would be no mechanism to validate the assumptions made during the dashboard design.

In summary, while this report provides a valuable foundation for understanding the objective parameters related to prison administration and case management within the Indian Justice System, its limitations lie in its exclusion of subjective criteria and ongoing evaluation metrics. These vital components could give a richer, more nuanced picture of access to justice. Future research should incorporate these components, ensuring a more robust and comprehensive evaluative framework.

5. CONCLUSION

In conclusion, this report comprehensively explores the application of evaluative criteria and metrics on dashboards, focusing on access to justice within the context of the Indian Justice System. By examining a wide array of relevant literature, defining dashboards, and developing and applying evaluative criteria to two specific dashboards—one for digitised prison records and the other for tracking cases in different courts—this report significantly contributes to our understanding of how data visualisation tools can enhance the efficiency and transparency of justice systems. Moreover, the thorough delineation of the scope of this study sets a clear benchmark for future research and potential application in other areas of the justice system.

However, it is essential to acknowledge the limitations of this report, chiefly its focus on objective parameters to the detriment of subjective criteria and a lack of ongoing evaluation metrics. Despite these limitations, the report offers valuable insights and lays the groundwork for future studies. Further research should address these limitations by integrating subjective criteria, user traffic statistics, satisfaction surveys, and periodic impact assessments, making the evaluative framework more comprehensive. Thus, the foundations laid in this report will catalyse an improved

understanding and refinement of dashboards for justice administration, ultimately aiding in enhancing access to justice for all.

About India Justice Report

The India Justice Report (IJR) remains the only comprehensive quantitative index using government's own statistics to rank the capacity of the formal justice system operating in various states. This IJR is a collaborative effort undertaken in partnership with DAKSH, Commonwealth Human Rights Initiative, Common Cause, Centre for Social Justice, Vidhi Centre for Legal Policy and TISS-Prayas. It continues to track improvements and persisting deficits in each state's structural and financial capacity to deliver justice based on quantitative measurements of budgets, human resources, infrastructure, workload, and diversity across police, judiciary, prisons and legal aid for all 36 states and UTs.

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