

VIVO: Faculty Research Information System and Discovery

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Abstract

Information about research and research activities is being scattered in various places such as HR system, course management, grant management system, institutional repositories, open and commercial citation databases, funding agencies and scholarly publishers. The research output and activities of the Institute or Faculty need to be archived with the matured architecture adhering International Standards. The existing system and data are not interoperable within or across the organisation. The publication's information does not reflect the area of expertise of individual or organisation. VIVO is an open source, semantic-based, community-maintained software developed by Cornell University for research discovery and networking of scholars

Keywords: Research Information System, profile, Research Network, Semantic Web

Introduction

Institutes or scholars often seeking funds for the research project, it is challenging task and time-consuming process to find out potential collaborator for the research project, project proposal review, inter-disciplinary research. Information about research and research activities is being scattered in various places such as HR system, course management, grant management system, institutional repositories, open and commercial citation databases, funding agencies and scholarly publishers. The research and progress of research within or across the institute is not visible to the research community or do not get due publicity due to lack of sharing the research activities or lack of awareness about the open source tools, techniques. The research output and activities of the Institute or Faculty need to be archived with the matured architecture adhering International Standards.

Institute level research activities, provided organised in the proper manner, as the nation, we could save huge money and efforts. Development of Research Information System compatible with international standard is vital for any organisation to showcase the research activities to the peer group, research analysis, and reporting.

1. What is Research Information Management System?

Research information Management System (RIMS) is the integrated management of information about the research life-cycle and its entities such as researchers, research output, organisations, grants and facilities (Dempsey, 2014). The Research Information Management system serve as knowledge management system for the research echo system. It connects the faculty, institutions, national researcher network by harvesting the research related information from the authenticated sources such as HR system, national and international identity providers, citation information providers and grant management system, etc. The



RIMS provide greater visibility onto institutional research activity and support for better research reporting. In the recent years, there has been huge demand from the research administration to systematically organize research activities at the institute level. The major functional areas of RIMS are publication management, award management and identification of award opportunities, publishing of expert profiles, grant management and identification of funding opportunities, research analytics, and reporting, etc.

2. Challenges in the Research Life Cycle

The major focus of research information system is to synchronize the data across parts of the institutions and in return it would reduce the burden to collect and manage data about the research process. The existing system and data are not interoperable within or across the organisation. The publication's information does not reflect the area of expertise of individual or organisation. The Preliminary Report from the Harvard University Planning Committee for Science and Engineering (The University Planning Committee for Science and Engineering, 2006) recommend that "Harvard University scale and dispersed geography make it difficult to know what other research is taking place at the University or what lab and research capabilities exist in other departments, schools or hospitals. No searchable databases exist for research or teaching expertise, and there is no central repository of Harvard faculty abstracts and ongoing research. This is a fairly straightforward IT problem. Our recommendations suggest ways Harvard can use information technology to inform its researchers about the interests, skill, and experience of other researchers on campus".

3. Stack holders Expectation

The major stakeholders of research information system are scholars, faculty members, and research administrators. The need and expectation of these stakeholders are differing. The scholar's expectation would be 1) Find mentors, advisors; locate facilities, events, and fellowship; 2) Find courses in an area of interest and find research focus of organisation and faculty. The faculty members expectation would be 1) To minimize the time spend on repetitive data; 2) To ensure their work is discoverable and the data should be inter-operable; 3) Showcase their contributions to the peer groups and funding agencies; and 4) Increase funding opportunities for research and greater exposure to the international community. On the other hand the research administrator expects the research information system to reduce the burden of research administration such as 1) Build research reports, carry out performance assessment, research impact analysis; 2) Find research progress and area of expertise of faculty, department and schools; 3) Improve faculty collaboration within or across departments and organizations; 4) Research grant information and management, etc.

4. RIMS products

Recent years have seen a proliferation of both commercial and open source application as well as services to support RIMS that enhance the citation, discovery of researchers and their scholarship. Some of the leading commercial RIMS are as follows;

- ❖ **Pure:** Pure is a commercial Research Information Management System service provided by the Elsevier. "Pure aggregates organization's research information from numerous internal and

external sources, and ensures the data that drives help the organisation to make strategic decisions, comprehensive and accessible in real time. A highly versatile centralized system, Pure enables the organization to build reports, carry out performance assessments, manage researcher profiles, enable research networking and expertise discovery and more, all while reducing the administrative burden for researchers, faculty, and staff” (“Pure,” 2014).

- ❖ **Converis:** Converis is one of the major product of Thomson Reuters and now acquired by Clarivate Analytics. It is fully configurable research information management system that can manage the complete research lifecycle, from the earliest due diligence in the grant process through the final publication and application of research results. The Converis help the organisation to build scholarly profiles based on our publishing and citations data (“Converis,” 2016).
- ❖ **Symplectic Element:** Element is the commercial RIMS service provided by the Digital Science. The element provides software and service to help the organisation understand their research collaboration networks through automated data integration from various internal and external sources (“Symplectic Element,” 2015).

5. VIVO as Research Information System

VIVO is an open source, semantic-based, community-maintained software developed by Cornell University in 2004 for research discovery and networking of scholars (Krafft, Cappadona, Devare, Lowe, & Corson-rikert, 2010). VIVO supports the organisation to collect, organize and visualizing

scholarly activities. VIVO enables the faculty and organisation to showcase the scholarly records, research discovery, finding the collaborator, network analysis and assessment of research impact. The research data in the VIVO may be added manually or through automated data ingest process from numerous sources such as HR system, grants, courses, faculty activity database, publication aggregators and funding agencies. VIVO support research analytic such as co-author network and the map of science that enhance the visibility of scholarly work among the academic peers and provide an opportunity for collaborative research.

The VIVO project supported by several national and international agencies such as funding agencies, academic institutions, professional societies, for-profit publishers, and data providers, as well as a variety of efforts with the semantic web and ontology development communities. Significant partners support to standardize the VIVO project and enhance the inter-operability, which include Consortium Advancing Standards in Research Administration Information (CASRAI), Euro Current Research Information Systems (EuroCRIS) and the Open Researcher and Contributor ID (ORCID) (“VIVO Activities and Partners,” 2016). Since 2013 Duraspace become the incubator to further develop and promote the VIVO Project among the academic and R&D organizations across the world.

5.1. VIVO Features and Characteristics

The VIVO is a customizable ready-to-use research information management system, which offers a wide range of features and functionalities. Some of the major features are as follows:

- ❖ Profile information can be automatically imported from authoritative institutional data sources as well as from external sources;
- ❖ Information like research interests, publications, presentations, etc. can be easily customized on the site;
- ❖ Identify current work and find an expert with precision and reliability;
- ❖ Standard vocabulary such as AGROVOC, GEMET, LCSH, UMLS to describe the area of expertise;
- ❖ SOLR search index with faceted result to precise search and retrieval;
- ❖ Altmetric data from social media and citation from citation information providers;
- ❖ Export profile information in RDF/XML format for data interoperable; and
- ❖ Integrate with other open source tools through API for better reporting and analytics.

5.2. Visualisation and Reporting

Data analytics and visualization is the emerging area in the scholarly communication system, which provides the graphical representation of the research data in a sophisticated way. Research Administrator often requires report on the research progress, funding status, return on investment in research, etc. The VIVO support four different reference system, which includes timeline for temporal analysis, map of world for geospatial analysis and visualization, map of science to represent expertise of individual, department, institute, and egocentric network visualization to render co-author and co-investigator network (Tank, Linnemeier, Kong, & Börner, 2012).

5.2.1. Co-author Network and Co-Investigator Network

The scholars, faculty and research administrator are very much interested in exploring the nature of the relationship among the faculty and department, patterns, occurrence of communities to understand the relationship among the faculty or predict the research progress within the organisation and across the organisation. The VIVO render the co-author network as the egocentric network visualization based on the paper published with other authors. The co-author network shown in the figure 1, helps the end user to visualize the network of authors with a number of collaborated publication and number of times collaborated. The coinvestigator network rendered is based on the research project, grant information and their investigators.

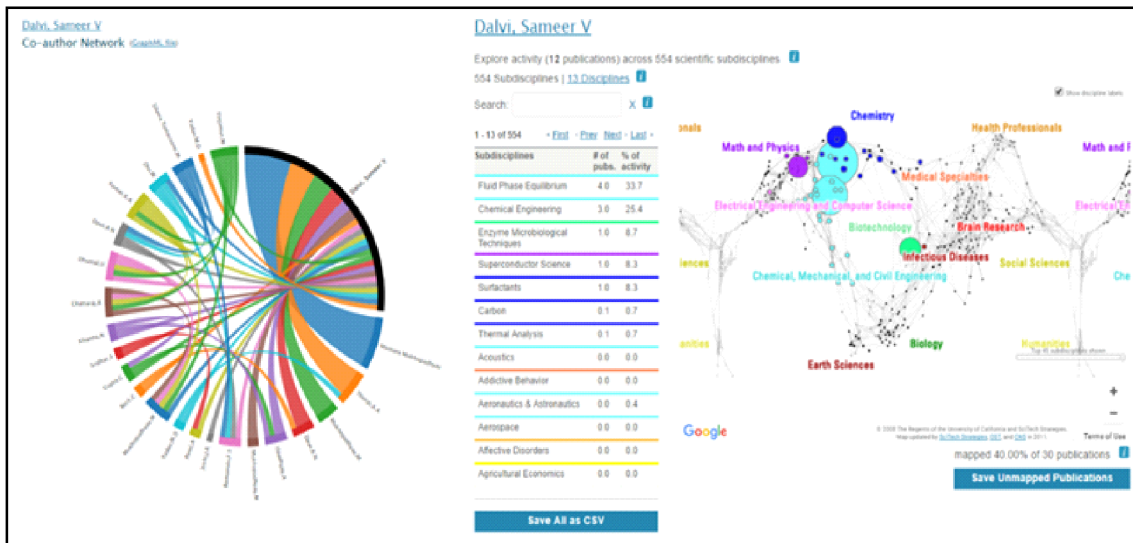


Figure 1: Co-author Network and Map of Science

5.2.2. Map of Science

The VIVO uses UCSD map of science (Figure 1) to envision the specialization of the people, department, organisation, group of organisations. The UCSD map of science and classification system developed by University of California San Diego (UCSD) comprising of article level data of the journals from Elsevier’s Scopus and Thomson Reuters’ Web of Science (WoS) for the years 2001-2010 (Börner et al., 2012). The 25,000 journals titles clustered into 13 broad subject disciplines and re-clustered into 544 sub-disciplines and these disciplines represented by specific color. In VIVO, the map of science is used as spatial visualization, allowing the end user to ascertain area of expertise of people, departments, schools, institutions. The science map provides the mapping term on the left side and color map on the right side.

6. Conclusion:

Scholars are connected electronically to colleagues, funding agencies and administrators. However, the source of scholarship, the research related information is not having much visibility due to the non-availability of common formats with standards. Faculty members and research administrators repeatedly perform menial tasks to satisfy the administrative or funding agencies requirements. As such, scholarly communication activities have not kept pace with the demand and expectation of the scholars. An open source research information management system with international standard help the organisations to minimize time spend on research report and assessment and give more time to the actual research. The semantic-based VIVO provides a wide range of features and functionalities to carry out the scholarly communication activities in an efficient way. Around 147 organizations using VIVO all over the world to showcase the research activities, networking of people, research report and

analytics, etc. The institute level distributed research information management system using VIVO help the scholars to showcase the research activities to the peer groups and funding agencies.

7. References

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