

Designing Altmetrics Enabled Discovery Services through DSpace

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Abstract - Discovery service is very important in an automated and digital library system. There are different types of this services are available in an online environment such as google scholar, research gateway, ebsco, summon, exlibris primo, worldcat and etc. This is very popular service and enable customization in different fields such as end user accounts, branding, embedding your chat service, turning off and on certain resources, custom search boxes, embedded widgets, facets modifications, language choices, and content and underlying technology infrastructure philosophies may vary, but the results are largely the same. Altmetrics is a part of discovery services to developing any online based institutional digital repository for enhancing the library and information services among the research scholars, users, students, and teachers also. The objective of this paper is to explore and access the altmetrics enabled services from the DSpace user interface for fulfilling the discovery services in an integrated digital library system. Apart from this it also describe some well-known altmetrics enabled tools available in an online environment. Now, this integrated framework is very helpful for each and every sphere of institutional digital repository for designing and developing the altmetrics enabled discovery services through an open source software DSpace.

Keywords: Institutional Digital Repository, Dspace, Altmetrics, Discovery Services and Visualization

I. INTRODUCTION

Information explosion and proliferation is a greatest problem in digital environment. This can be solved by using different tools and techniques in scientific and social impact of different research publications. Altmetrics gives the lots of facilities in this stage of modern science. Researchers have needed to read all the articles of his/her area but the problem of time. Now, this can be solved by using the altmetrics because readers have easy to identify the highest impact paper from the all relevant resources. In 2017 Williams had discussed a independent review and evaluation of altmetrics for academics to consider when adopting, utilizing, and researching these tools. Altmetrics furnish opportunities those scientists or researchers cannot get through other-measures, including discussion and symposium of works in progress and unpublished research articles and resources. Htoo & Na in 2017 have explores the application of altmetrics in different disciplines of social science deals that there is a frequently increase in the number of research articles which receive altmetric mentions in all disciplines. It represents the disciplines where altmetrics are most fairly applicable, effective, and potentially useful for the better management online

resources available in different website and social networking. Apart from this it also gives the full proof evidence that altmetrics are an effective and efficient use of complement to citation in disciplines with low citation rates. Mandal in 2018 has explore the application of web discovery services through VuFind is possible for retrieving the different types of resources among the users. Bonnet & Brady in 2017 have designed altmetrics workshops to seed conversations to track the impact of researchers' from multidiscipline diverse scholarly, innovative and creative outputs represents an increased user awareness and satisfaction of impact tracking tools that capture traditional scholarship, non-traditional scholarly and creative outputs. In 2017, Karanatsiou, Misirlis & Vlachopoulou have discussed the application of altmetrics and bibliometrics for measuring the citation indicator in the field social media. In 2019 Saberi & Ekhtiyari have successfully and effectively investigate the usage, captures, mentions, social media and citations of highly cited papers in the field of Library and information science for increasing the recall and precision of online resources.

Big data is also an important aspect in altmetrics which shows by Konkiel & Guichard during 2018. "Of the 10,934 papers published in 2016 by New Zealand (2016 NZ) researchers, 5,413 (49.5 per cent) were mentioned 86,915 times in one of the 16 sources that Altmetric tracks. Twitter, news outlets and Facebook were among the sources that showed the most engagement with New Zealand 2016 research. Citation analysis tools in Dimensions showed that New Zealand 2016 research had a higher than average Field Citation Ratio (1.51) and Relative Citation Ratio (1.29)". In 2018 Mandal & Roy have discussed the graph visualization is possible of different students and friends by using the online RDF based script. In 2017, Tammaro had discussed the performance measurement and metrics for librarians by using the altmetrics of three books review. Again, in 2017, Carpenter & Lagace deals with the development of standards and community recommended practices around altmetrics will encourage adoption of new metrics forms and will add to the trust in those metrics for the research academy. In 2015, Zuccala and others can assess the value of Goodreads reader ratings for measuring the wider impact of scholarly books published in the field of History. Again, in 2015, Bornmann has investigated the PLOS data to usefulness of altmetrics for measuring the broader impact of research.

II. ALTMETRICS

Altmetrics is also known as non-traditional bibliometrics in scientific and scholarly resources which increases the impact of citation metrics in two components like h-index and impact factor of article available in online databases. The origin of the year of altmetrics was in 2010 for measures of article level metrics and citations of different journal websites. However, the implications and applications of altmetrics are in different components such as books, journals, people, data sets, presentations, videos, web pages, source code of repositories and etc. It can be used in the platform of web 2.0 such as application programming interface open source scripts and code. Altmetrics is not only cover citation counts, apart from this it also calculate scholar impact on the basis of diverse online research output in different aspects like online news media, social media, online reference managers and so on. It is a proof of evidence both the impact and the detailed composition of the citation impact factor. Although it can be applied of different mediums to increase the activities and functions such as research filter, promotion and tenure dossiers, grant applications and for ranking newly-published articles in academic search engines. Proliferation of information of digital resources in the field of web 2.0 area which changed the research publication behaviour seeking and sharing it within or outside the academy for construct and measure the new innovative interface and scientific impact on a particular scholar work. Now, the traditional metrics are needful and useful if researcher as well as scholar have insufficient to measure immediate and uncited impacts or outside the peer-review sphere.



Fig. 1 Altmetrics interface in cloud environment

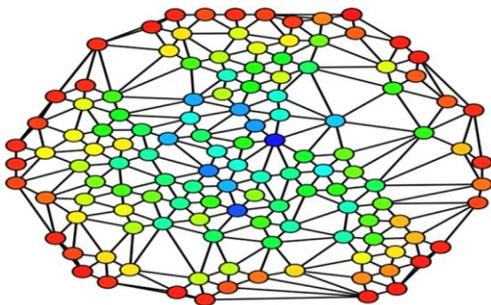


Fig. 2 Altmetrics interface from external database

Impact story can be easily calculated by using popular tools by Altmetrics and plum analytics and also several publishers have initiated to provide such type of information such as

Elsevier, public library of science, BioMed central, nature publishing group and so on. During 2008 the Journal of Medical Internet Research was started to systematically collect tweets about its articles. Starting in March 2009, the Public Library of Science was also introduced article-level metrics for all articles in different subjects and sub-disciplines. Meanwhile, different funders and projects have started together showing interest in alternative metrics of articles like UK Medical Research Council. It has been used in applications for promotion review by scientific scholars and researchers for better outcome from social cites and information seeking gateway of several universities such as the University of Pittsburgh. The important snapshot of altmetrics is shown in the Fig. 1 and Fig. 2. In spite it is also experimented that an article used less amount of attention to jump to the upper quartile of ranked research papers, suggesting that not enough sources of altmetrics at present available to give a balanced picture of impact for the majority of papers and in this regard some well-known popular tools are represents as follows:

III. IMPACT STORY

Impact Story is an altmetric Web-enabled tool which helps it make easy to track different link for increasing the citation and impact factor of a wide range of research areas including papers, datasets, slides, research code for exploration and proliferation of digital resources. It is aggregates impact of digital or electronic data from different sources of information such as Twitter and other aspects (<https://altmetrics.org/tools/>).

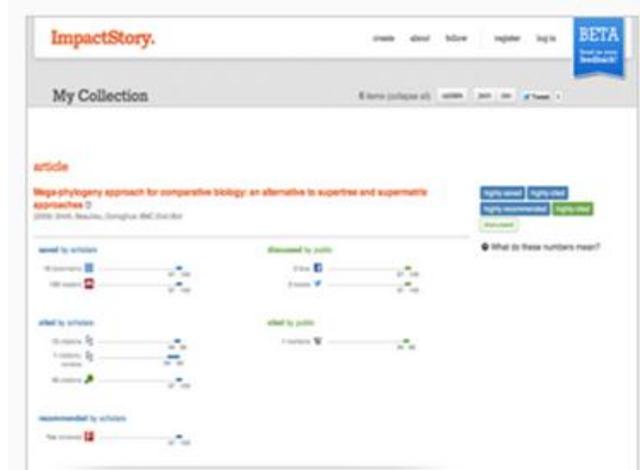


Fig. 3 ImpactStory interface in altmetrics (<https://altmetrics.org/tools/>)

IV. READER METER

Reader Meter is a cloud computing and information mashup visualizing tool. Two important things associated with it such as author-level and article-level statistics based on the consumption of scientific content by a large population of readers in Internet environment and readership data obtained by using the API of Mendeley. Thus, the reports are available both as HTML and JSON format (<https://altmetrics.org/tools/>).

Science for enhancing the library and information services (<https://altmetrics.org/tools/>).

VII. PAPER CRITIC

Paper Critic is an altmetric tool which offers to researchers a process of monitoring all types of feedback about their research work in exhaustively, expidiciously, and pinpointedly. Apart from this it is also allows every researcher to easily review the research work of others in a relevant field or sub-field (<https://altmetrics.org/tools/>).



Fig. 4 ReaderMeter interface in altmetrics (<https://altmetrics.org/tools/>)

V. SCIENCE CARD

Science Card is an altmetric tool for website which collects metrics automatically in different ways such as citations, download counts, altmetrics in a different discipline for a particular researcher by a unique author identifier (<https://altmetrics.org/tools/>).

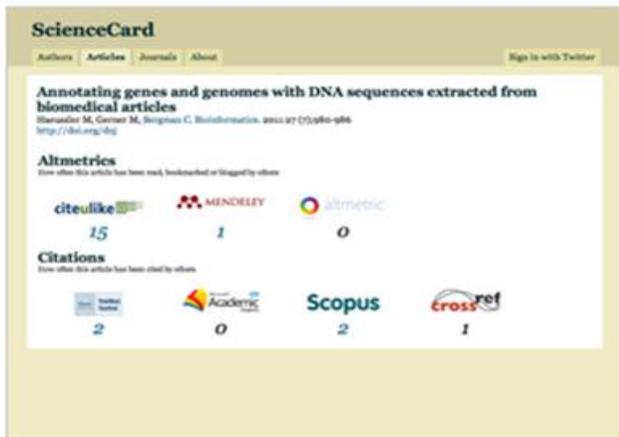


Fig. 5 ScienceCard interface in altmetrics (<https://altmetrics.org/tools/>)

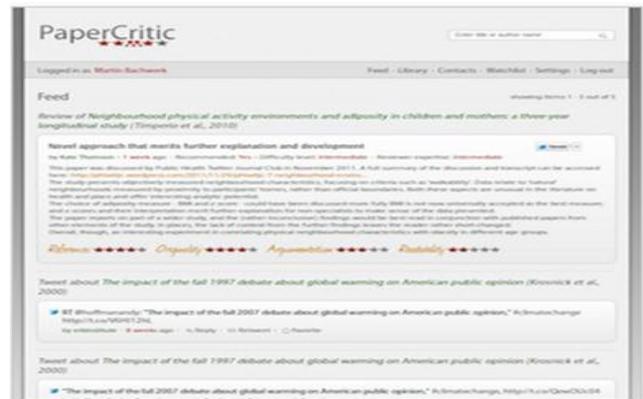


Fig. 7 PaperCritic interface in altmetrics (<https://altmetrics.org/tools/>)

VIII. CROWDOMETER

CrowdoMeter is an altmetric tool. It is a web enabled services which display tweets linking to scientific articles, and allows users to add semantic information for the betterment of digital services among the users. It is a subset of the Citation Typing Ontology for the characterization of citations both factually and rhetorically for displays the results in real-time (<https://altmetrics.org/tools/>).

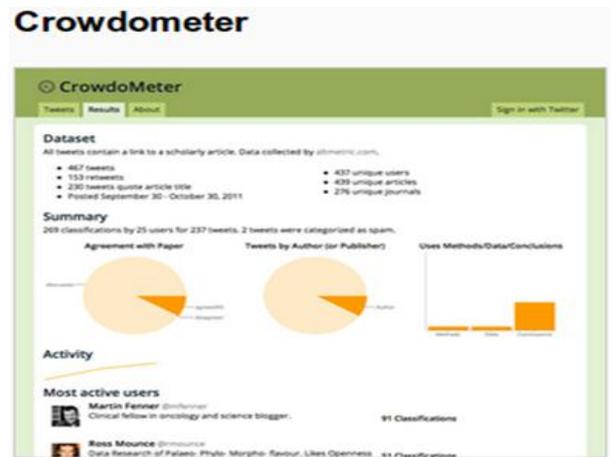


Fig. 8 CrowdoMeter interface in altmetrics (<https://altmetrics.org/tools/>)



Fig. 6 PLoS Impact Explorer interface in altmetrics (<https://altmetrics.org/tools/>)

VI. PLOS IMPACT EXPLORER

This is also an import tool in the field of altmetric which explore and allows to browse the conversations collected by altmetric.com for papers published by the Public Library of

Code is essential for exploring the altmetrics institutional digital repository. Fig. 9 is represents the altmetrics code for enhancing the library and information services. This is more important for each and every digital repository. So altmetrics can be access by using this code in html or xml environment.

```
<script type='text/javascript' src='https://dlbxb8u5lmmw7.cloudfront.net/assets/embed.js'></script>
<div class='altmetric-embed' data-badge-type='donut' data-doi='10.1038/nature.2012.9872'></div>
<div data-badge-popover='right' data-badge-type='medium-donut' data-doi='10.1038/nature.2014.14583' data-hide-no-mentions='true' class='altmetric-embed'></div>
<div class='altmetric-embed' data-badge-type='donut' data-arkiv-id='1209.4191'></div>
<div class='altmetric-embed' data-badge-type='donut' data-pmid='2171119'></div>
<div class='altmetric-embed' data-badge-type='donut' data-handle='2022/14471'></div>
<div class='altmetric-embed' data-badge-type='donut' data-isbn='978-3-319-25557-6'></div>
<div class='altmetric-embed' data-badge-type='donut' data-uri='http://ecancer.org/news/3182-genetic-marker-in-vitamin-d-receptor-gene-associated-with-increased-pancreatic-cancer-survival.php'></div>
<div class='altmetric-embed' data-badge-type='donut' data-urn='urn:nbn:de:hbz:294-46567'></div>
<div class='altmetric-embed' data-badge-type='medium-donut' data-badge-details='right' data-doi='10.1136/bmj.39471.430451.BE'></div>
<div class='altmetric-embed' data-badge-type='donut' data-condensed='true' data-badge-details='right' data-doi='10.1136/bmj.39471.430451.BE'></div>
<div class='altmetric-embed' data-badge-type='medium-donut' data-hide-less-than='100' data-badge-details='right' data-doi='10.1136/bmj.39471.430451.BE'></div>
<div class='altmetric-embed' data-hide-no-mentions='true' data-doi='10.1016/S0140-6736(11)61619-X'></div>
<div data-badge-type='donut' class='altmetric-embed' data-badge-popover='left' data-doi='10.1016/S0140-6736(11)61619-X'></div>
<div class='altmetric-embed' data-badge-popover='bottom' data-doi='10.1016/S0140-6736(11)61619-X'></div>
<div data-badge-type='medium-donut' class='altmetric-embed' data-badge-details='right' data-doi='10.1016/S0140-6736(11)61619-X'></div>
<div class='altmetric-embed' data-doi='10.1016/S0140-6736(11)61619-X'></div>
<div class='altmetric-embed' data-doi='10.1016/S0140-6736(11)61619-X'></div>
<div class='altmetric-embed altmetric-doi-10.5339/connect.2012.9 altmetric-badge-type-donut altmetric-badge-popover-left'></div>
<div class='altmetric-embed altmetric-doi-10.5339/connect.2012.9 altmetric-badge-type-donut altmetric-badge-popover-right'></div>
```

Fig. 9 Altmetrics code for DSpace

IX. ALTMETRICS CONFIGURATION OF DSPACE

Space is written by using the high level language through java and its fully support the altmetrics enabled discovery services for institutional digital repository. Configure the files under the sub-directory of config>modules> altmetrics .cfg (See Fig. 10) and here on or true of necessary fields for tracking the different parameters and fields of a particular researcher or author. This can be achieved through author identifier.

```
#####
#-----IMPACT METRICS DISPLAY CONFIGURATIONS-----#
# Configuration properties used by Impact Metrics badges
#-----#
# Metadata field which contains the interesting identifiers
altmetrics.field = dc.identifier.uri
#-----#
# Configure altmetric.com badges.
# See http://apl.altmetric.com/embeds.html
#-----#
# Is the Altmetric.com badge enabled?
altmetric.enabled = true
# Possible values: donut medium-donut large-donut 1 4
altmetric.badge-type = donut
# Possible values: left right top bottom
altmetric.popover = bottom
# Possible values: right
altmetric.details = right
# Possible values: true
#altmetric.hideNoMentions =
# e.g. blank
#altmetric.linkTarget =
#-----#
# Configure PlumX Artifact widgets.
# See https://pplu.mx/plitt/developers/widgets
#-----#
# Is the PlumX Artifact widget enabled?
plumx.enabled = true
# Possible values: popup summary details
plumx.widget-type = popup
# Used with widget types: popup
# Possible values: top bottom left right
#plumx.data-popup = left
```

Fig. 10 Altmetrics configuration of DSpace

X. ALTMETRICS INTERFACE OF DSPACE

DSpace is well known open source software in the field of institutional digital repository. It is fully support the altmetrics facilities and services. This service is also known as discovery services for online environment. The Fig. 11 is represents the altmetrics interface in DSpace. This is the badge facilities in digital or electronic environment. Advanced level linked open data can be managed by using the altmetrics concept in present and future digital repository. The Fig. 12(a) & Fig. 12(b) is shown for social networking in digital library system.

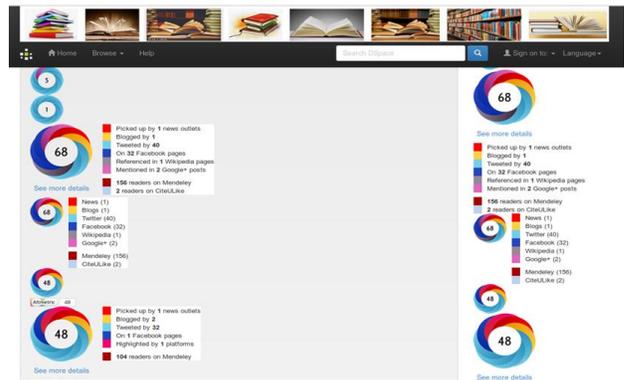


Fig. 11 Altmetrics interface in DSpace

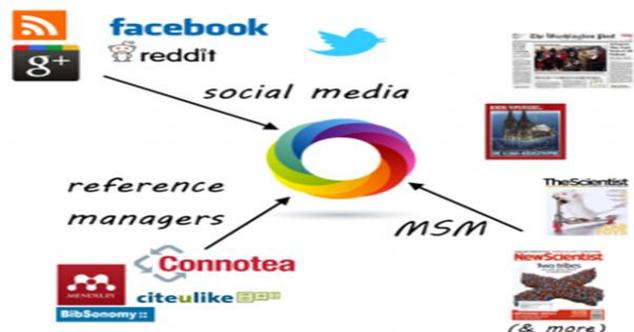


Fig. 12(a) Altmetrics interface from social networking

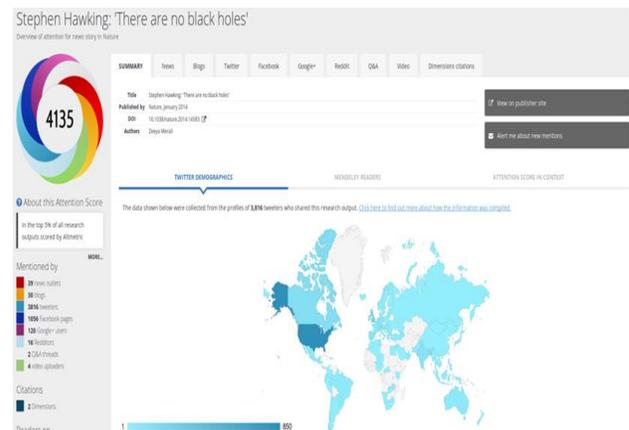


Fig. 12(b) Altmetrics interface from social networking

XI. CONCLUSION

Digital discovery services can easily be enhance the information and knowledge of records from different libraries catalog and digital online institutional repository. There are several different methods for getting the local records into the institutional repository index through open source software. It is also fully support the retrieval of digital resources among the users with simple retrieval system and services in learning content recommendation. Now the main objective of resources discovery service is to enable the users to easily read their essential documents in smooth and simple way e.g. Google. In accordance with Robinson, Molenda & Rezabek, educational technology is "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources". Digital and online resource is an important part of education system. Education system is change in modern day to day activities and this can be achieved by using the social network such as facebook, twitter, blog, whatsapp and so on. Altmetrics can easily be identified the metrics of citation of each researcher from the facebook, twitter and other media. This is the new innovative features of digital library environment. This can be successfully integrated and access by using the DSpace digital repository software for enhancing the information and knowledge among the users. Generally we know the bibliometric is only tool for measuring the citation and impact factor. In present age google scholar and research gate have display this type of information. Pearl Zhu was propounded a valuable comments: "A digital CIO has to be a digital visionary, a transformational leader; an empathetic communicator; a good facilitator, a great listener, and an excellent digital game changer." It can easily be managed the link resolver of digital resources in terms of points to online resources, driven by knowledge bank or database, and library maintains this database of subscriptions to databases, subscriptions to journals, and open access content. Researchers can scientists they have to find their important documents and related documents from the relevant sources of altmetrics supported website like DSpace. So, obviously it can say that institutional digital repository and data visualization is possible against in metrics of all articles available in predatory journals. This is the great opportunity for researchers, teachers, and students to access and download the full text resources available in a library website.

REFERENCES

- [1] Bonnet, J. L., & Méndez-Brady, M. (2017). Making the mission visible: altmetrics and nontraditional publishing. *Digital Library Perspectives*, 33(4), 294–304. Retrieved from <https://doi.org/10.1108/DLP-01-2017-0002> (Accessed on January 15, 2018)
- [2] Bornmann, L. (2015). Usefulness of altmetrics for measuring the broader impact of research: A case study using data from PLOS and F1000Prime. *Aslib Journal of Information Management*, 67(3), 305–319. Retrieved from <https://doi.org/10.1108/AJIM-09-2014-0115> (Accessed on March 10, 2019)
- [3] Carpenter, T. A., & Lagace, N. M. (2017). Defining community recommended practice for altmetrics: The NISO alternative metrics project completes its work. *Performance Measurement and Metrics*, 18(1), 9–15. Retrieved from <https://doi.org/10.1108/PMM-09-2016-0039> (Accessed on February 7, 2018)
- [4] Htoo, T. H. H., & Na, J.-C. (2017). Disciplinary differences in altmetrics for social sciences. *Online Information Review*, 41(2), 235–251. Retrieved from <https://doi.org/10.1108/OIR-12-2015-0386> (Accessed on May 11, 2019)
- [5] Karanatsiou, D., Misirlis, N., & Vlachopoulou, M. (2017). Bibliometrics and altmetrics literature review: Performance indicators and comparison analysis. *Performance Measurement and Metrics*, 18(1), 16–27. Retrieved from <https://doi.org/10.1108/PMM-08-2016-0036> (Accessed on July 6, 2018)
- [6] Konkiel, S., & Guichard, S. (2018). Altmetrics: "big data" that map the influence of New Zealand research. *Library Hi Tech News*, 35(4), 1–5. Retrieved from <https://doi.org/10.1108/LHTN-04-2018-0021> (Accessed on September 22, 2018)
- [7] Mandal, Sukumar (2018). Application of Web Discovery Services through VuFind. *International Journal of Computer Application*, 1(8), 85-93. (2250-1797). Retrieved from <https://dx.doi.org/10.26808/rs.ca.i8v1.09> (Accessed on May 2, 2019)
- [8] Mandal, Sukumar & Roy, Sushanta Kumar. (2018). Linked open data: FOAF-enabled graph visualization. *Chinese Librarianship: an International Electronic Journal*, 45, 10-20. Retrieved from <http://www.iclc.us/cliej/cl45MR.pdf> (Accessed on March 8, 2019)
- [9] Robinson, Rhonda, Molenda, Michael & Rezabek, Landra. "Facilitating Learning" (PDF). *Association for Educational Communications and Technology*. Retrieved 25th May 2019.
- [10] Saberi, M. K., & Ekhtiyari, F. (2019). Usage, captures, mentions, social media and citations of LIS highly cited papers: an altmetrics study. *Performance Measurement and Metrics*, 20(1), 37–47. Retrieved from <https://doi.org/10.1108/PMM-10-2018-0025> (Accessed on February 24, 2019)
- [11] Tammaro, A. M. (2017). Altmetrics for Librarians: Three Books Review. *Performance Measurement and Metrics*, 18(1), 88–91. Retrieved from <https://doi.org/10.1108/PMM-01-2017-0003> (Accessed on April 26, 2019)
- [12] Williams, A. E. (2017). Altmetrics: an overview and evaluation. *Online Information Review*, 41(3), 311–317. Retrieved from <https://doi.org/10.1108/OIR-10-2016-0294> (Accessed on May 4, 2019)
- [13] Zhu, Pearl. 12 CIO Personas: The Digital CIO's Situational Leadership. Retrieved from <https://www.goodreads.com/quotes/tag/information-technology>
- [14] Zuccala, A. A., Verleysen, F. T., Cornacchia, R., & Engels, T. C. E. (2015). Altmetrics for the humanities: Comparing Goodreads reader ratings with citations to history books. *Aslib Journal of Information Management*, 67(3), 320–336. Retrieved from <https://doi.org/10.1108/AJIM-11-2014-0152> (Accessed on April 16, 2019).