

# **Does Open Access Business Model Have a Significant Impact on Citation of Publications? –**

## **Case Study in the Field of Civil Engineering**

# OA Generally

- OA as a reaction to the increasing prices of scholarly and scientific journals.
- The most important boost of OA was when a number of funding bodies, research councils and governmental bodies, begun transforming their view on publication of research they were financing.

# Economic Models for OA Journals

- The Gold path.
  - The Green path.
  - The Hybrid model.
  - Publication fees or article-processing charges (APC) have become the predominant means for funding professional OA journals.
  - Recent findings are suggesting that OA publishing funded through APC is likely to increase furthermore.
- (Solomon and Björk, 2012).

# The Principal Two Arguments for OA

- The subscription-based publishing model has produced a crisis of accessibility to the scientific literature.  
(Open access..., 2010).
- The research article access is a problem.  
(Harnad et al., 2009).

**Availability of the article is not  
a sufficient condition for the citation  
but it is a necessary one.**

# Citation Analysis and Impact of OA

- The citation analysis is based on information seeking behavior of the researchers as they have to cite their information resources.
- This is the main reason why OA impact on availability of information sources for researchers was also a topic, which was researched by bibliometrical methods, namely citation analysis.

# OA Can Increase Usage and Impact of Articles

Hypothesis:

**OA increases the number of potential users of any given article.** The researchers who would otherwise have been unable to access it because their institution could not afford the access-tolls of the journal can easily use OA articles. Therefore OA can only increase both usage and impact.

# Methodology

- As stated by Moed (2005):
  - »Outcomes of citation analysis must be valued in terms of a qualitative, evaluative framework that takes into account the substantive contents of the works under evaluation«.
- The comparison of the citation counts of individual OA and non-OA articles published in the same non-OA journals was suggested as the correct method. (Harnad and Brody, 2004).

# OA Analysis Review

- Some authors have reported that online availability considerably increases a paper's impact.

(Harnad and Brody 2004, Antelman 2004, Eysenbach 2006).

- There are also some analysis which do not confirm the link between OA and the increasing number of citation.

(Craig et al. 2007, Norris et al. 2008, Miguel et al. 2011).



# Two OA Postulates

1. **The quality effect** (authors post their most quality articles open accessible).
2. **The early view effect** (preprints are visible earlier and are cited more often) impacts on number of citations.

**Therefore the OA articles may receive more citations than non-OA articles.**

# Factors That Influence Citations

Many factors implicated on citations (beside OA)  
as:

- the number of authors on the paper,
- funding from competitive grants,
- the scientific field,
- **QUALITY** of publication.

# Case Study in the Field of Civil Engineering

# Research

- Three journals were chosen and articles published in 2007 were analysed.
- We used the number of their citations in GS and WOS until end of February 2012.
- OA articles with non-OA articles in the same journal were distinguished.

# The Criteria for Journal Choice

- In which the researchers from UL FGG have published in 2007.
- They are present in both systems, GS and WOS.
- They are present in the same WOS subject category: civil engineering.
- They are in upper half of category.

# Selected Journals

IF 2007

<i>Automation in Construction</i>	0.61
<i>Journal of Computing in C. Engineering/ASCE</i>	0.71
<i>Computers &amp; Structures</i>	0.93

# Table 1: The Number of Articles

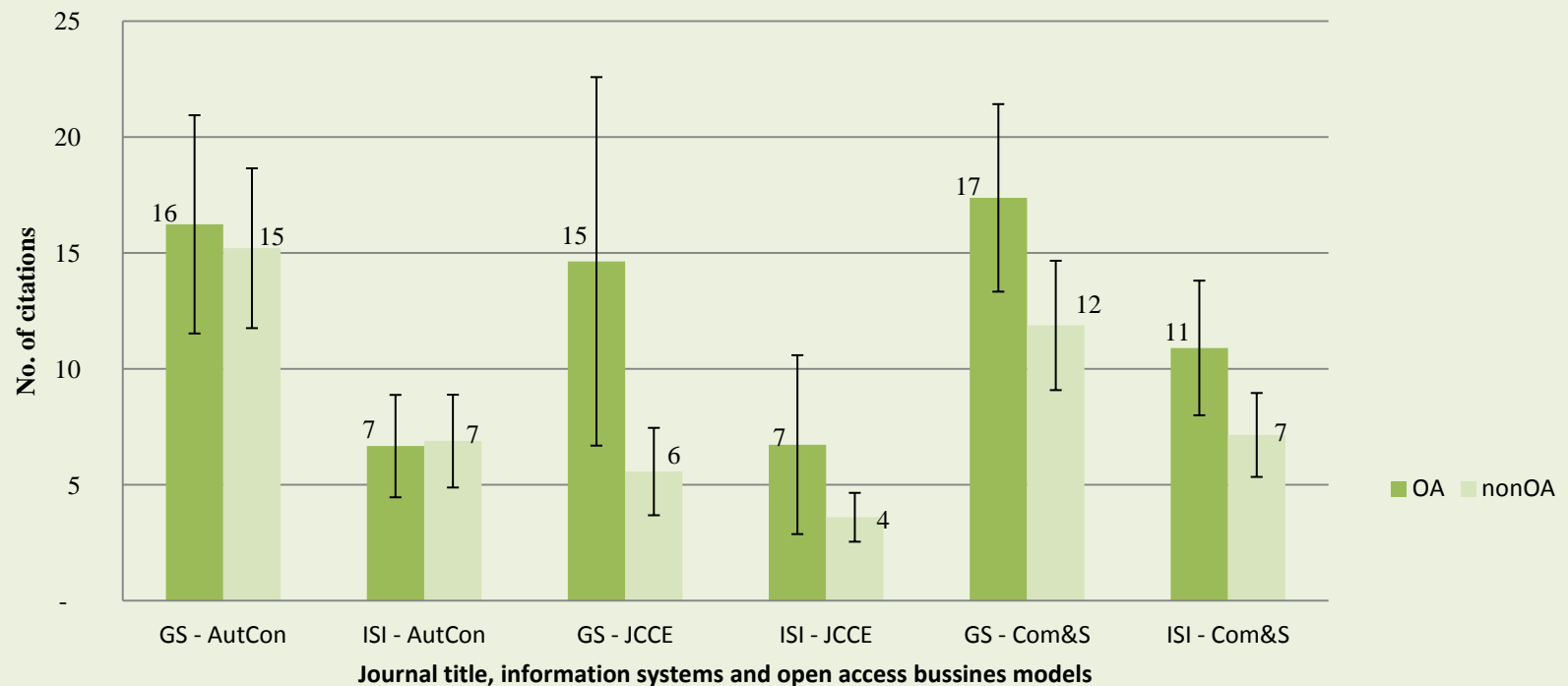
	No. of OA articles	Share %	No. of non-OA articles	Share %	Total	Share %
AutCon	30	34	59	66	89	100
JCCE- ASCE	11	23	37	77	48	100
Comp&Str	40	27	109	73	149	100

# Table 2: Total Values of Obtained Citations

			OA	non-OA
AutCon	GS	max	41	65
		min	1	1
		Median	13	10
	WOS	max	23	40
		min	0	0
		Median	5	4
JCCE-ASCE	GS	max	35	22
		min	3	0
		Median	16	3
	WOS	max	15	11
		min	0	0
		Median	8	3
Com&Struct	<b>GS</b>	max	<b>47</b>	<b>103</b>
		min	1	0
		Median	13	8
	<b>WOS</b>	max	<b>37</b>	<b>64</b>
		min	1	0
		Median	10	5



# The Arithmetic Mean of Citations and 95% Confidence Intervals



# Discussion

- **OA articles received more citations than non-OA**, but, the t-test reveals that this applies to Computers & Structures only, (the significance level is  $\alpha=5\%$ ), **the journal ranked into the first quarter only.**
- In the case of JCCE-ASCE **open access significantly** (with the significance level 5 % or less) **affects** the number of citation **only in the GS database.**
- The effect of OA on citation number **is not significant** for Automation in Construction **in neither GS nor WOS.**
- The numbers of citations are very different for either OA or non-OA articles in the same journal.

# Summary

- The most cited article is a non-OA article.
- This article gets the maximum of citations in both information systems, GS and WOS.
- **OA articles received more citations than non-OA only in the journal, that is ranked in the first quarter.**

# Conclusions

- That **might** support other findings that, indeed, **the quality of the article is the important factor which influences the authors' decision to deposit the articles of highest quality into repositories.**
- This is also observed by Kurtz et al. (2005), Davis and Fromerth (2007), Craig et al. (2007) and Gargouri et al. (2010).

# The Final Answer to the Principle Question of the Paper?

Does open access have a significant impact  
on citations in the field of civil engineering?

**We dont know yet!**

**So this pilot study will be extended.**

# What we do know already?

- The OA **might** increase the number of citation.
- We need more research.
- Some other potentially influential factors have to be tested as well.
- In December 2012 at UL FGg the institutional repository DRUGG <http://drugg.fgg.uni-lj.si/> was set up.

Thank you for your attention.