

# ► 1 Investigating Hybrid Strategies for Systematic Literature Review

[...]

## Experiment 3

### Study

On the use of ontologies in software process assessment: a systematic literature review

Tarhan, Ayça and Giray, Gorkem

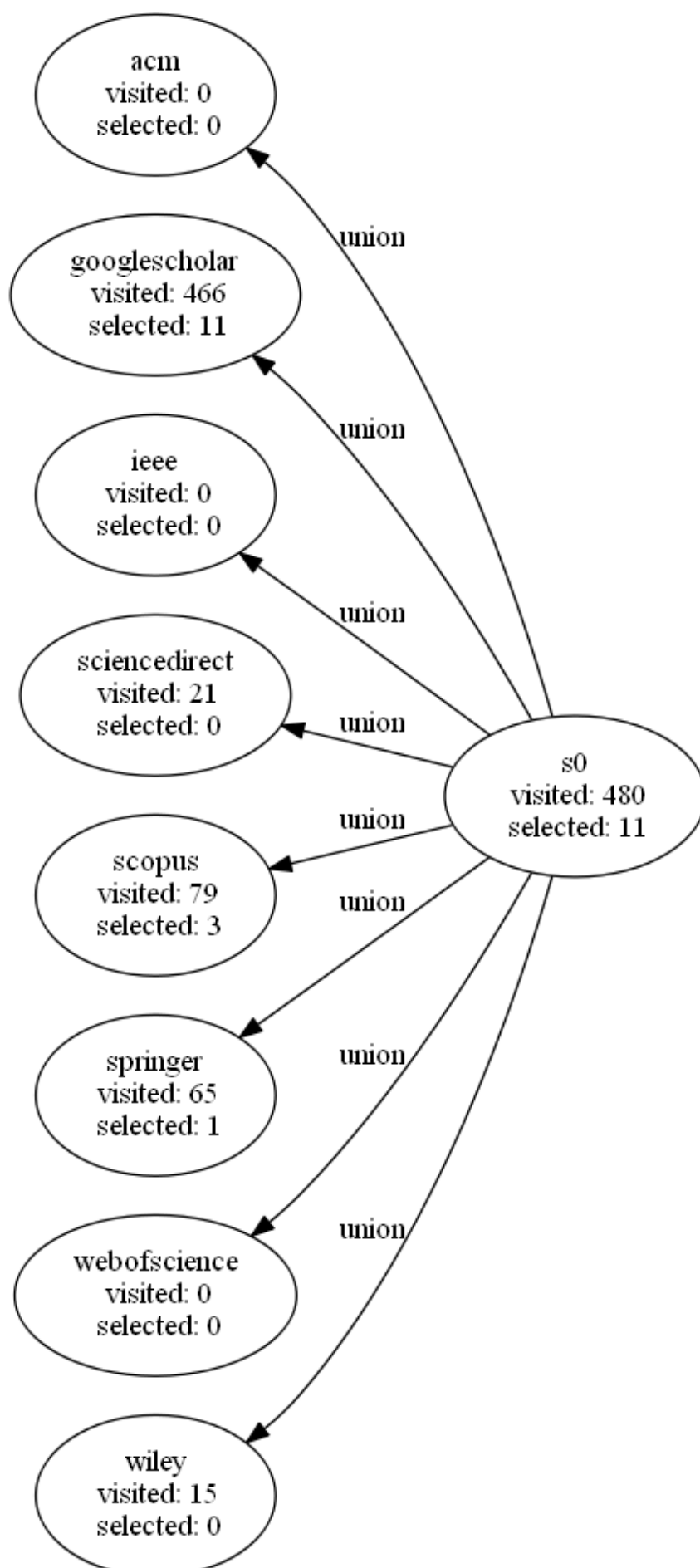
21st International Conference on Evaluation and Assessment in Software Engineering, EASE 2017

## ▼ 2 Strategies

### ▼ 2.1 Strategy 1 - Database Search (DB Search)

Total of selected studies = 11 (Seed Set) + 3 (Snowballing) = 14

Provenance Graph - Strategy 1 - Database Search (DB Search)



## Report Strategy 1 - Database Search (DB Search)

Total of selected studies in the SLR = 14

Precision = Selected/ Visited

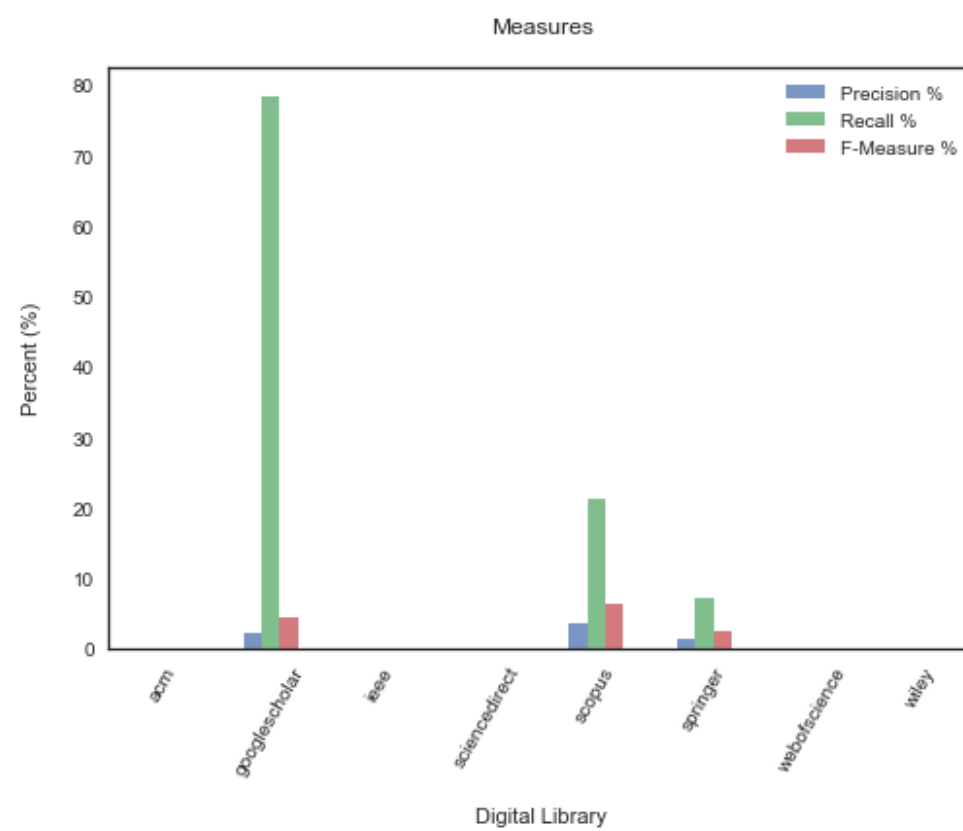
Recall = Selected/ Total of selected studies in the SLR

F-Measure = Harmonic Mean of Precision and Recall

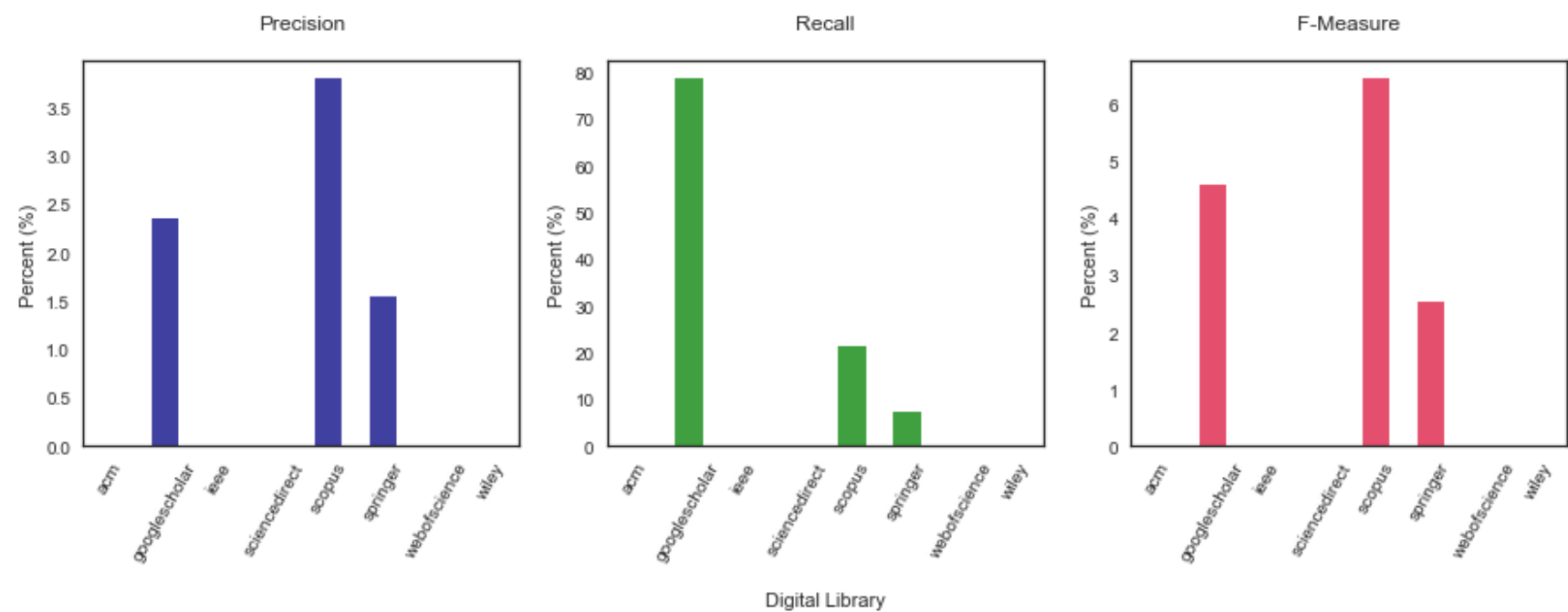
Out[9]:

Digital Library	Visited	Selected	Precision %	Recall %	F-Measure %
acm	0	0	nan	0.00	0.00
googlescholar	466	11	2.36	78.57	4.58
ieee	0	0	nan	0.00	0.00
sciencedirect	21	0	0.00	0.00	0.00
scopus	79	3	3.80	21.43	6.45
springer	65	1	1.54	7.14	2.53
webofscience	0	0	nan	0.00	0.00
wiley	15	0	0.00	0.00	0.00

Bar Chart Strategy 1



Bar Chart Strategy 1



## Report Strategy 1 - Measures of Strategy - Union of all digital libraries (accumulated)

Out[16]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
DB Search	480	11	2.29	78.57	4.45

### Report Strategy 1 - Total of papers retrieved from Excel and Duplicates.

Visited = Excel + Duplicates

Selected = Papers selected in the SLR

Excel = Papers retrieved from Excel provided by authors

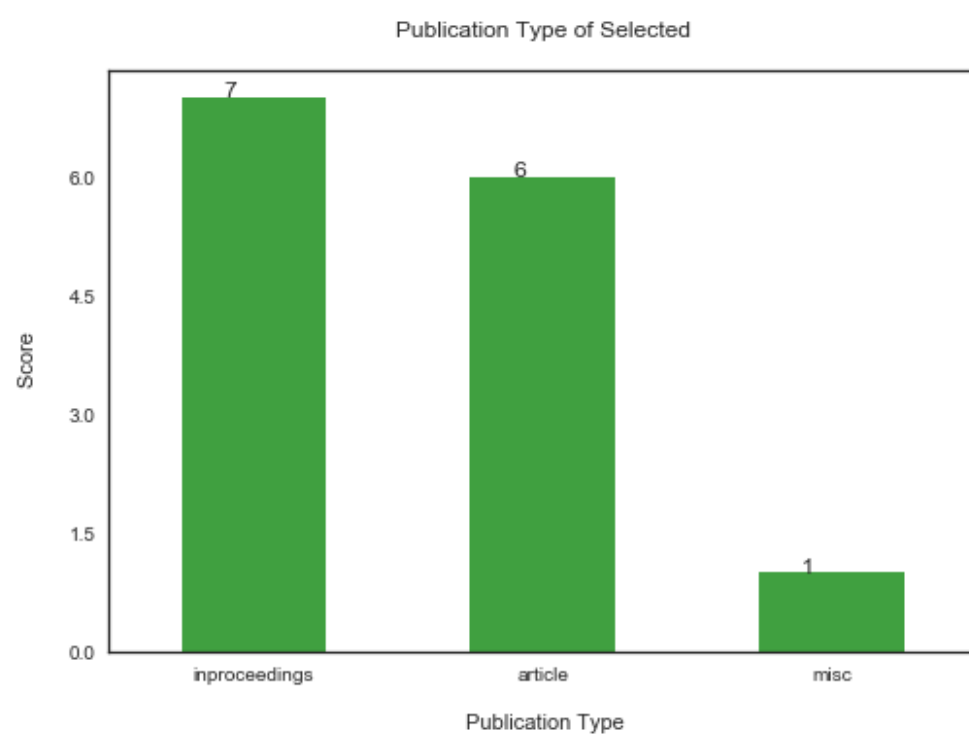
Excel Selected = Papers selected in the SLR and retrieved from Excel provided by authors

Duplicated = Papers identified as duplicate

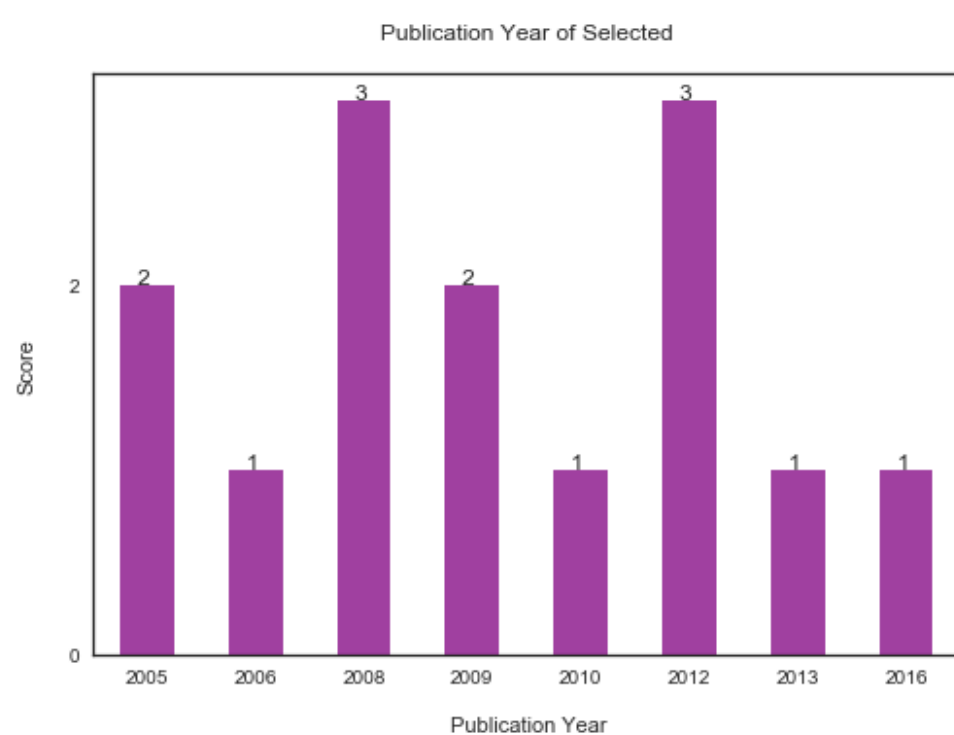
Out[17]:

Digital Library	Visited	Selected	Excel	Excel Selected	Duplicated
acm	0	0	0	0	0
googlescholar	466	11	466	11	0
ieee	0	0	0	0	0
sciencedirect	21	0	21	0	0
scopus	79	3	2	1	77
springer	65	1	65	1	0
webofscience	0	0	0	0	0
wiley	15	0	15	0	0

### Bar Chart Publications Type - Strategy 1



### Bar Chart Publications Year - Strategy 1



### Report Strategy 1 - Seed Set of each Digital Library - Intersection

[illegible]

[illegible]

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'googlescholar & sciencedirect & webofscience': [],
'googlescholar & sciencedirect & webofscience & wiley': [],
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#### Report Strategy 1 - Seed Set

Out[21]: 11

## Report Strategy 1 - Unique in the intersection

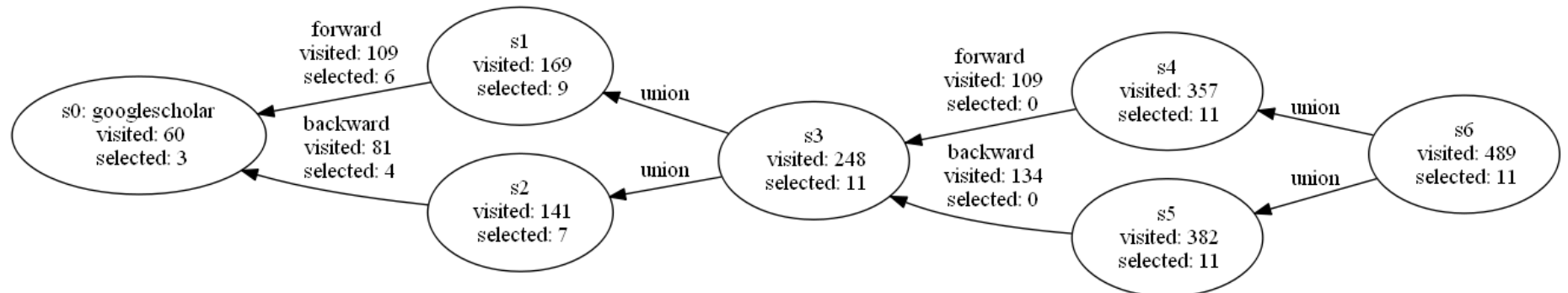
Out[22]: 7

## Report Strategy 1 - Empty set

Out[23]: ['acm', 'ieee', 'sciencedirect', 'scopus', 'springer', 'webofscience', 'wiley']

## ▼ 2.2 Strategy 2 - Informal Search (Google Scholar) + Snowballing of Wohlin Guideline = (SB Search (BS \* FS) )

### Provenance Graph - Strategy 2 - Informal Search (Google Scholar) + Snowballing of Wohlin Guideline = (SB Search (BS\*FS))



## Report Strategy 2 - Informal Search in Google Scholar + Snowballing of Wohlin Guideline = (SB Search (BS\*FS) )

Total of selected studies in the SLR = 14

Precision = Selected/ Visited

Recall = Selected/ Total of selected studies in the SLR

F-Measure = Harmonic Mean of Precision and Recall

Out[26]:

Scholar=s0 /State	Delta Visited	Delta Selected	Delta Precision%	Delta Recall%	Delta F_Measure%	Operation	Accumulated Visited	Accumulated Selected	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%
s0: googlescholar	60	3	5.00	21.43	8.11	-	60	3	5.00	21.43	8.11
s1	109	6	5.50	42.86	9.76	forward	169	9	5.33	64.29	9.84
s2	81	4	4.94	28.57	8.42	backward	141	7	4.96	50.00	9.03
s3	0	0	nan	0.00	0.00	union	248	11	4.44	78.57	8.40
s4	109	0	0.00	0.00	0.00	forward	357	11	3.08	78.57	5.93
s5	134	0	0.00	0.00	0.00	backward	382	11	2.88	78.57	5.56
s6	0	0	nan	0.00	0.00	union	489	11	2.25	78.57	4.37

## Report Strategy 2 - Measures of Strategy (accumulated)

Out[27]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
SB Search (BS*FS)	489	11	2.25	78.57	4.37

Diagrama de Venn - Strategy 2

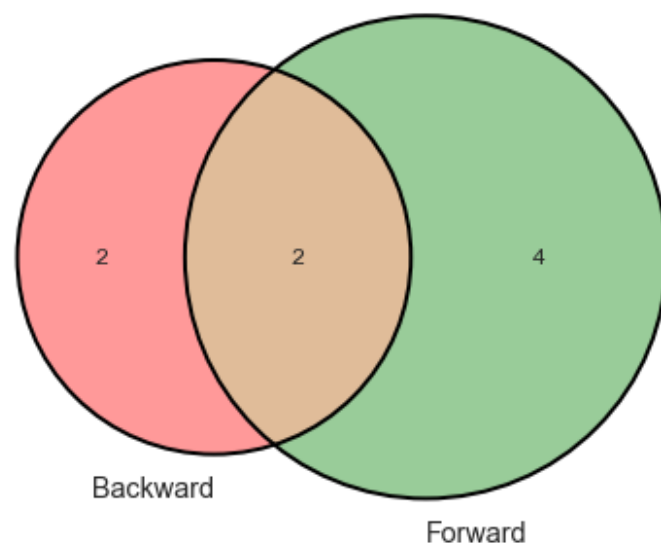
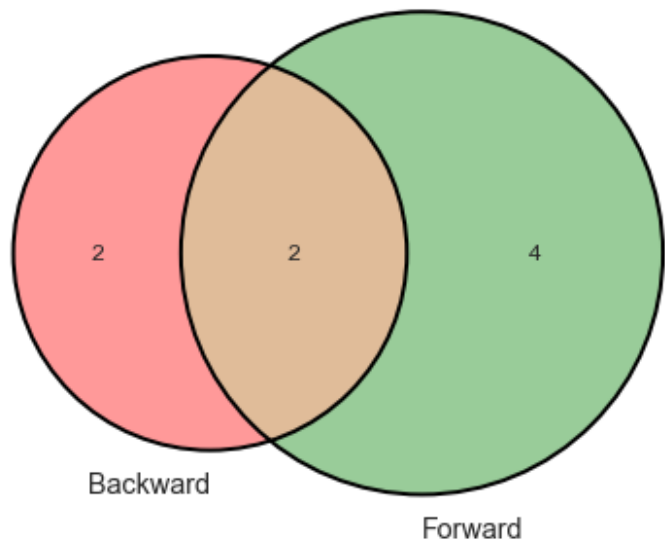


Diagrama de Venn - Strategy 2

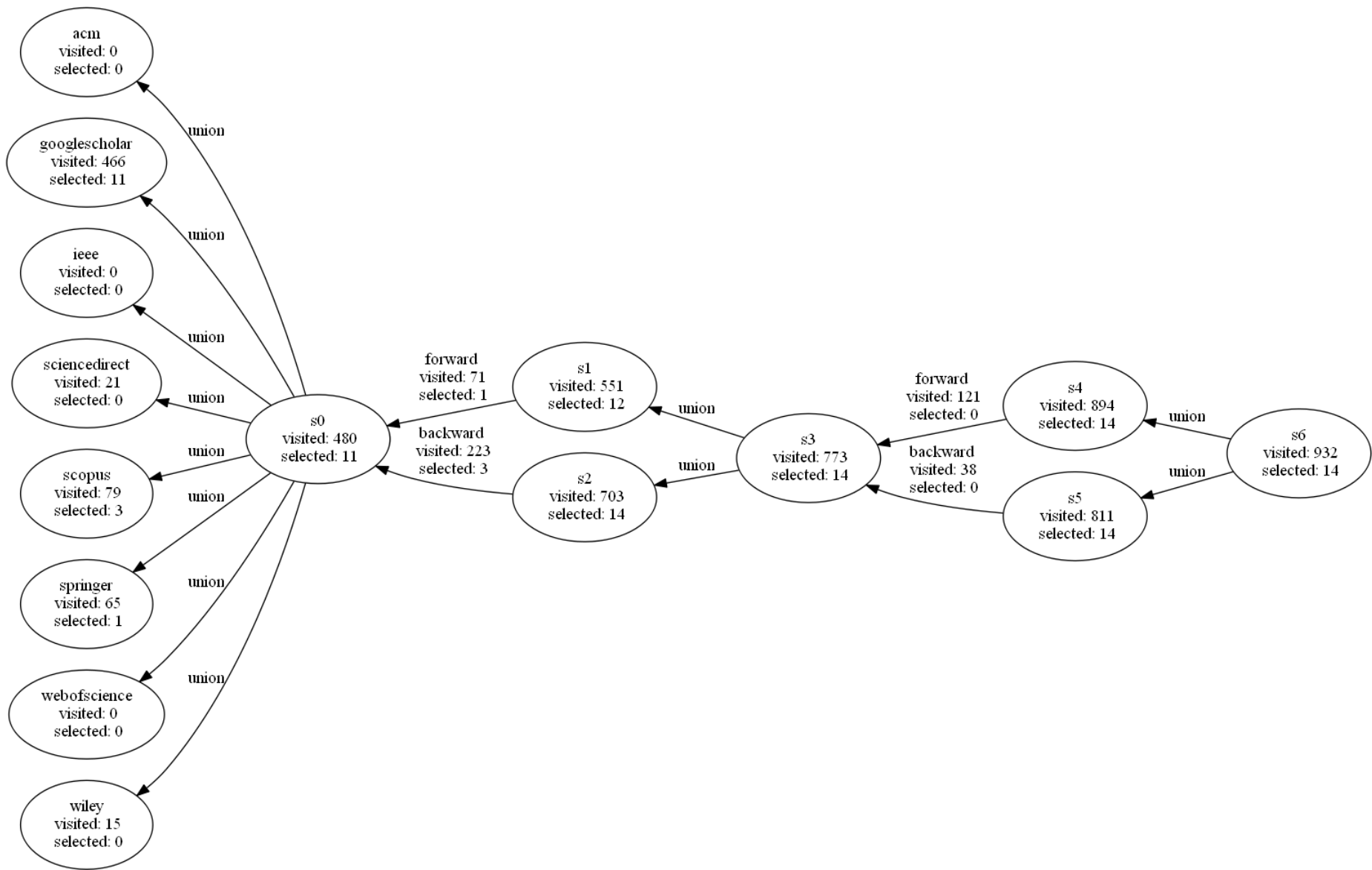


Report Diagrama de Venn

Backward ['lee2008a', 'gazel2009a', 'rungratri2008a', 'soydan2006a']  
Forward ['ryu2008a', 'soydan2012a', 'grambow2013a', 'grambow2012a', 'gazel2009a', 'soydan2006a']

▼ 2.3 Strategy 3 - Database Search + Snowballing of Wohlin Guideline (DB Search + BS \* FS)

Provenance Graph - Strategy 3 - Database Search + Snowballing of Wohlin Guideline (DB Search + BS\*FS)





Report Strategy 3 - Database Search + Snowballing of Wohlin Guideline (DB Search + BS\*FS)

Total of selected studies in the SLR = 14

Precision = Selected/ Visited  
Recall = Selected/ Total of selected studies in the SLR  
F-Measure = Harmonic Mean of Precision and Recall

Out[33]:

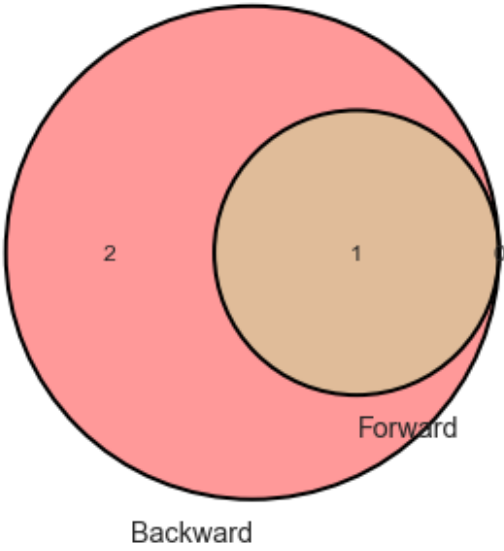
Digital Library/State	Delta Visited	Delta Selected	Delta Precision%	Delta Recall%	Delta F_Measure%	Operation	Accumulated Visited	Accumulated Selected	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%
acm	0	0	nan	0.00	0.00	-	0	0	2.29	0.00	0.00
googlescholar	466	11	2.36	78.57	4.58	-	466	11	2.36	78.57	4.58
ieee	0	0	nan	0.00	0.00	-	0	0	2.36	0.00	0.00
sciencedirect	21	0	0.00	0.00	0.00	-	21	0	0.00	0.00	0.00
scopus	79	3	3.80	21.43	6.45	-	79	3	3.80	21.43	6.45
springer	65	1	1.54	7.14	2.53	-	65	1	1.54	7.14	2.53
webofscience	0	0	nan	0.00	0.00	-	0	0	1.54	0.00	0.00
wiley	15	0	0.00	0.00	0.00	-	15	0	0.00	0.00	0.00
s0	0	0	nan	0.00	0.00	union	480	11	2.29	78.57	4.45
s1	71	1	1.41	7.14	2.35	forward	551	12	2.18	85.71	4.25
s2	223	3	1.35	21.43	2.53	backward	703	14	1.99	100.00	3.91
s3	0	0	nan	0.00	0.00	union	773	14	1.81	100.00	3.56
s4	121	0	0.00	0.00	0.00	forward	894	14	1.57	100.00	3.08
s5	38	0	0.00	0.00	0.00	backward	811	14	1.73	100.00	3.39
s6	0	0	nan	0.00	0.00	union	932	14	1.50	100.00	2.96

Report Strategy 3 - Measures of Strategy (accumulated)

Out[34]:

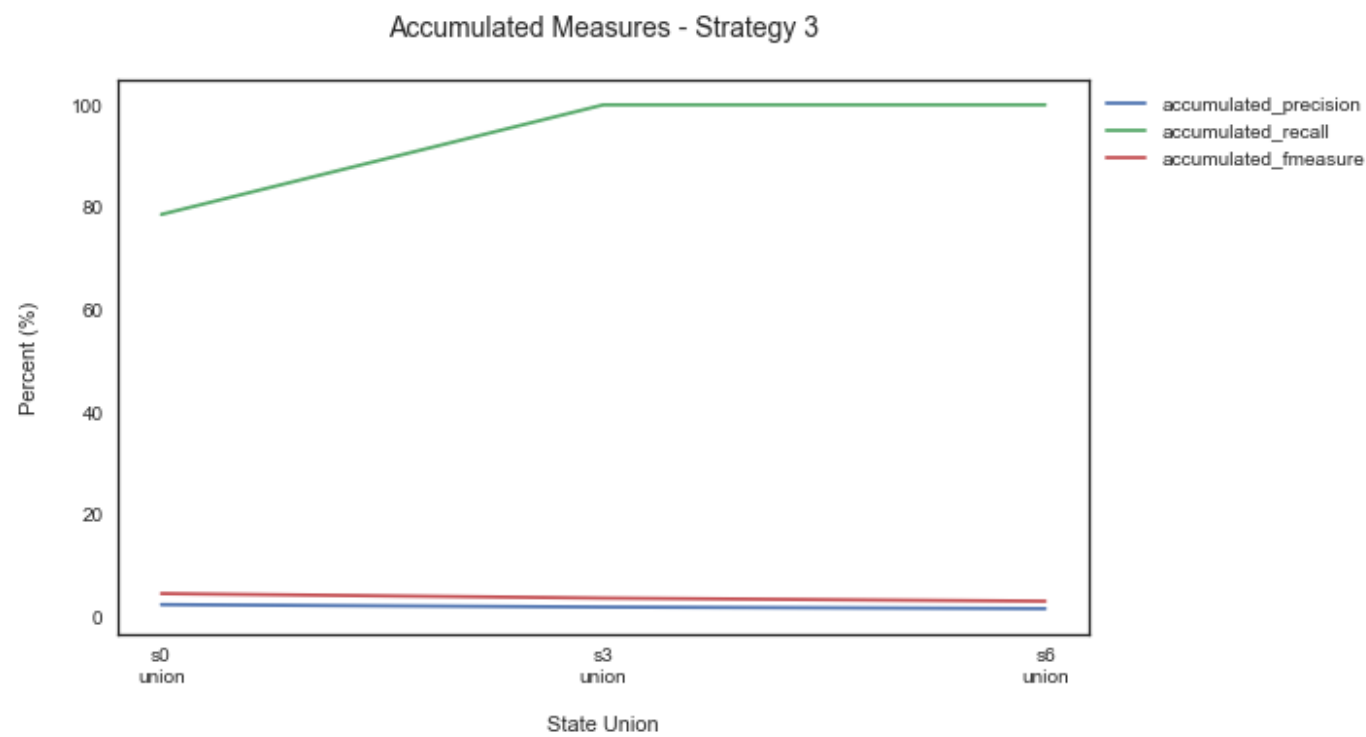
Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
DB Search + BS*FS	932	14	1.50	100.00	2.96

Diagrama de Venn - Strategy 3



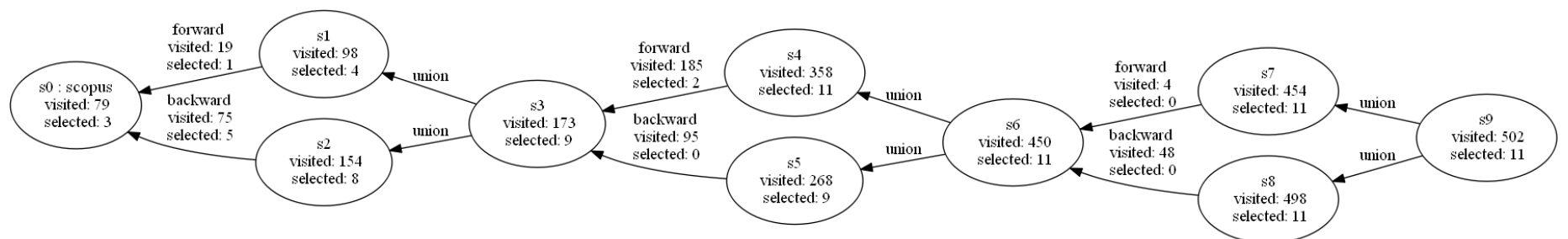
Report Diagrama de Venn

Backward ['lee2008a', 'lee2009a', 'soydan2006a']  
Forward ['soydan2006a']



## ▼ 2.4 Strategy 4 - Scopus + Snowballing of Wohlin Guideline (Scopus + BS \* FS)

Provenance Graph - Strategy 4 - Scopus + Snowballing (Guideline Wohlin) (Scopus + BS\*FS)



Report Strategy 4 - Scopus + Snowballing of Wohlin Guideline (Scopus + BS\*FS)

Total of selected studies in the SLR = 14

Precision = Selected/ Visited

Recall = Selected/ Total of selected studies in the SLR

F-Measure = Harmonic Mean of Precision and Recall

Out[40]:

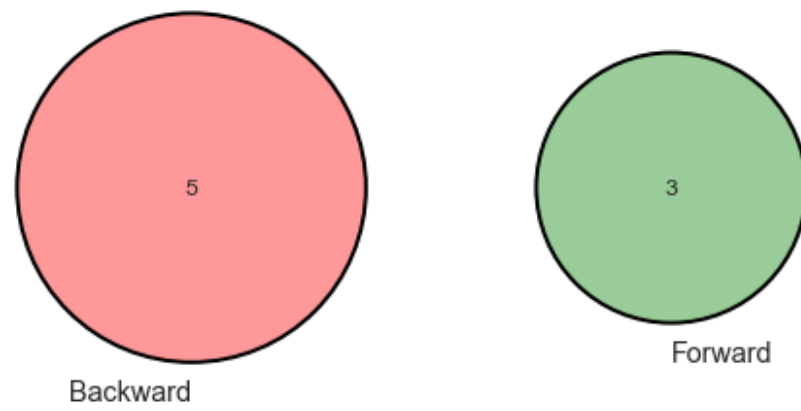
Scopus=s0 /State	Delta Visited	Delta Selected	Delta Precision%	Delta Recall%	Delta F_Measure%	Operation	Accumulated Visited	Accumulated Selected	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%
s0 : scopus	79	3	3.80	21.43	6.45	-	79	3	3.80	21.43	6.45
s1	19	1	5.26	7.14	6.06	forward	98	4	4.08	28.57	7.14
s2	75	5	6.67	35.71	11.24	backward	154	8	5.19	57.14	9.52
s3	0	0	nan	0.00	0.00	union	173	9	5.20	64.29	9.63
s4	185	2	1.08	14.29	2.01	forward	358	11	3.07	78.57	5.91
s5	95	0	0.00	0.00	0.00	backward	268	9	3.36	64.29	6.38
s6	0	0	nan	0.00	0.00	union	450	11	2.44	78.57	4.74
s7	4	0	0.00	0.00	0.00	forward	454	11	2.42	78.57	4.70
s8	48	0	0.00	0.00	0.00	backward	498	11	2.21	78.57	4.30
s9	0	0	nan	0.00	0.00	union	502	11	2.19	78.57	4.26

Report Strategy 4 - Measures of Strategy (accumulated)

Out[41]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
Scopus + BS*FS	502	11	2.19	78.57	4.26

Diagrama de Venn - Strategy 4

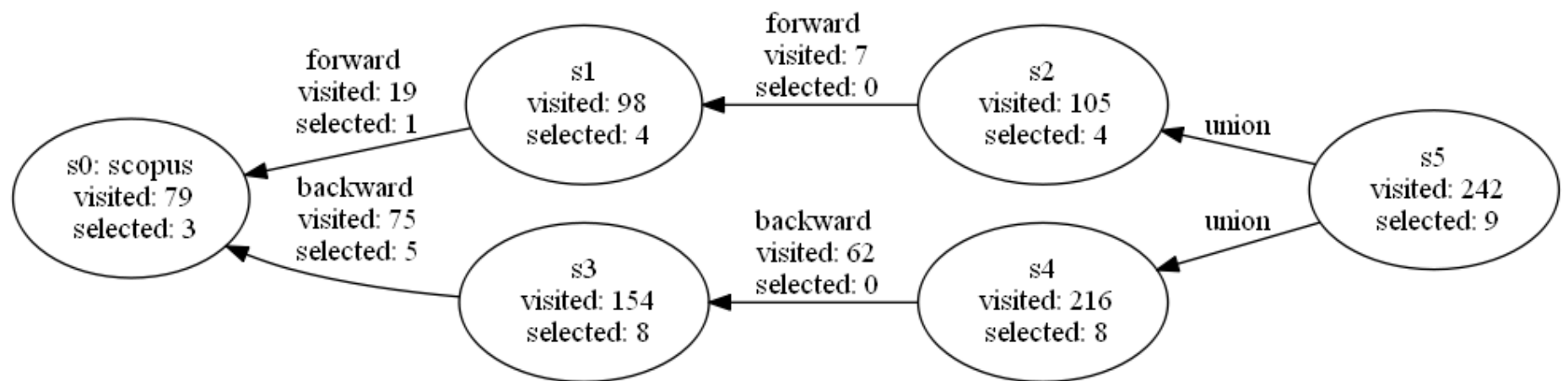


#### Report Diagrama de Venn

Backward ['lee2008a', 'lee2009a', 'soydan2006a', 'liao2005a', 'rungratri2008a']  
 Forward ['grambow2012a', 'soydan2012a', 'grambow2013a']

## ▼ 2.5 Strategy 5 - Scopus + Parallel Snowballing of Paper ESEM2017 (Scopus + BS||FS)

Provenance Graph - Strategy 5 - Scopus + Parallel Snowballing of Paper ESEM2017 (Scopus + BS||FS)



#### Report Strategy 5 - Scopus + Parallel Snowballing of Paper ESEM2017 (Scopus + BS||FS)

Total of selected studies in the SLR = 14

Precision = Selected/ Visited

Recall = Selected/ Total of selected studies in the SLR

F-Measure = Harmonic Mean of Precision and Recall

Out[46]:

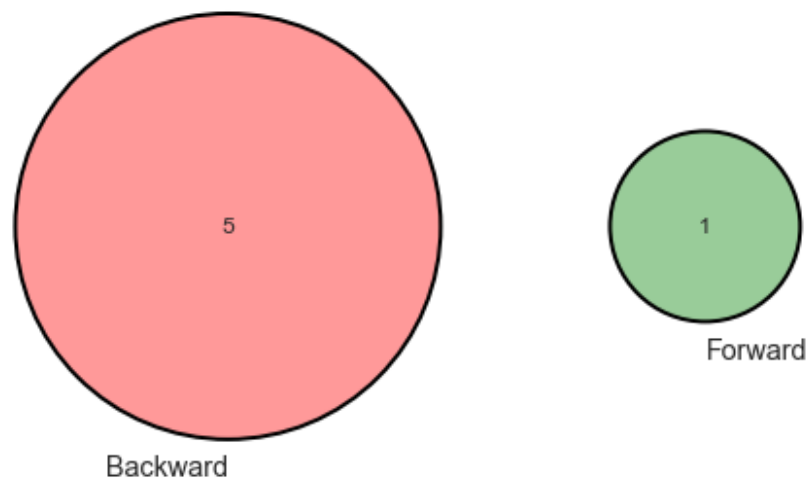
Scopus=s0 /State	Delta Visited	Delta Selected	Delta Precision%	Delta Recall%	Delta F_Measure%	Operation	Accumulated Visited	Accumulated Selected	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%
s0: scopus	79	3	3.80	21.43	6.45	-	79	3	3.80	21.43	6.45
s1	19	1	5.26	7.14	6.06	forward	98	4	4.08	28.57	7.14
s2	7	0	0.00	0.00	0.00	forward	105	4	3.81	28.57	6.72
s3	75	5	6.67	35.71	11.24	backward	154	8	5.19	57.14	9.52
s4	62	0	0.00	0.00	0.00	backward	216	8	3.70	57.14	6.96
s5	0	0	nan	0.00	0.00	union	242	9	3.72	64.29	7.03

#### Report Strategy 5 - Measures of Strategy (accumulated)

Out[47]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
Scopus + BS  FS	242	9	3.72	64.29	7.03

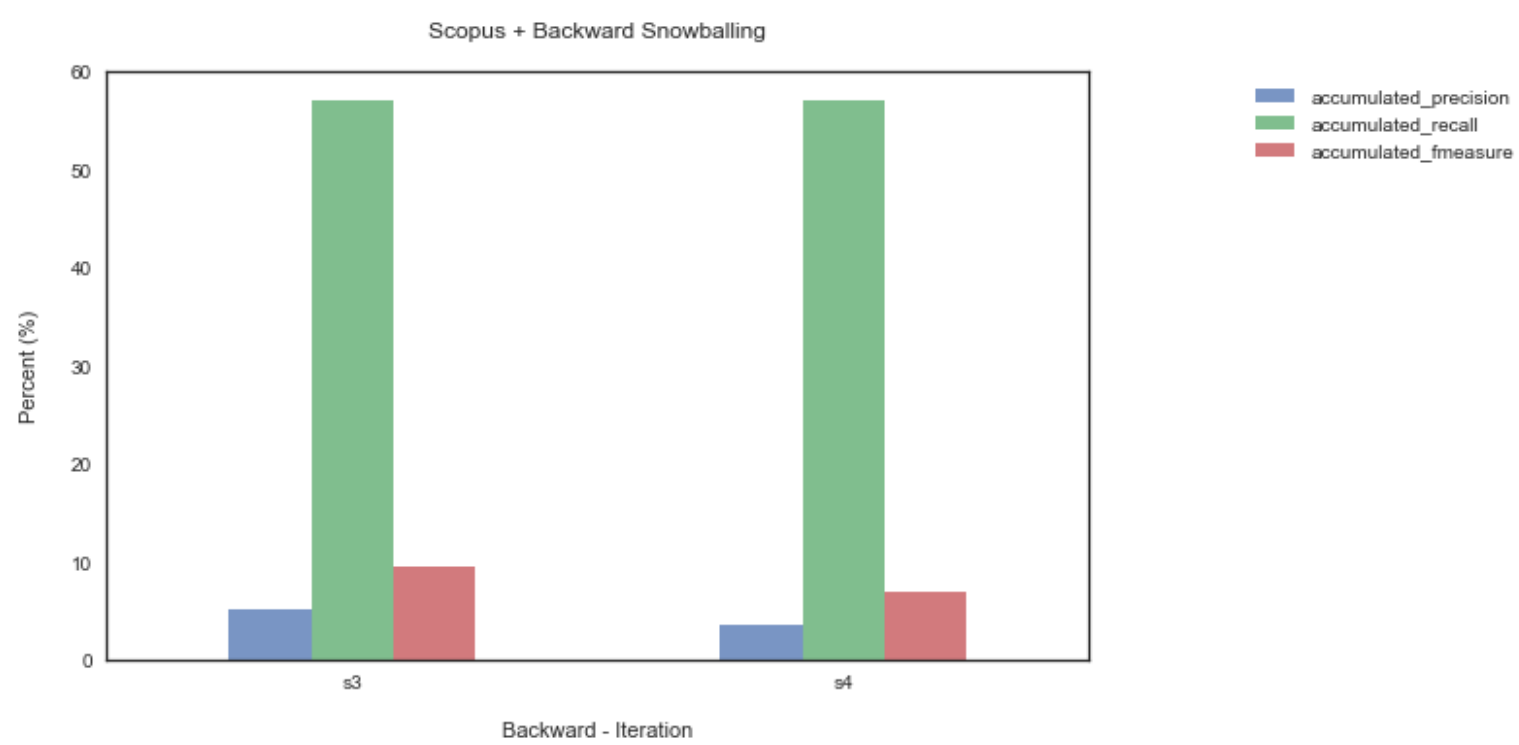
Diagrama de Venn - Strategy 5



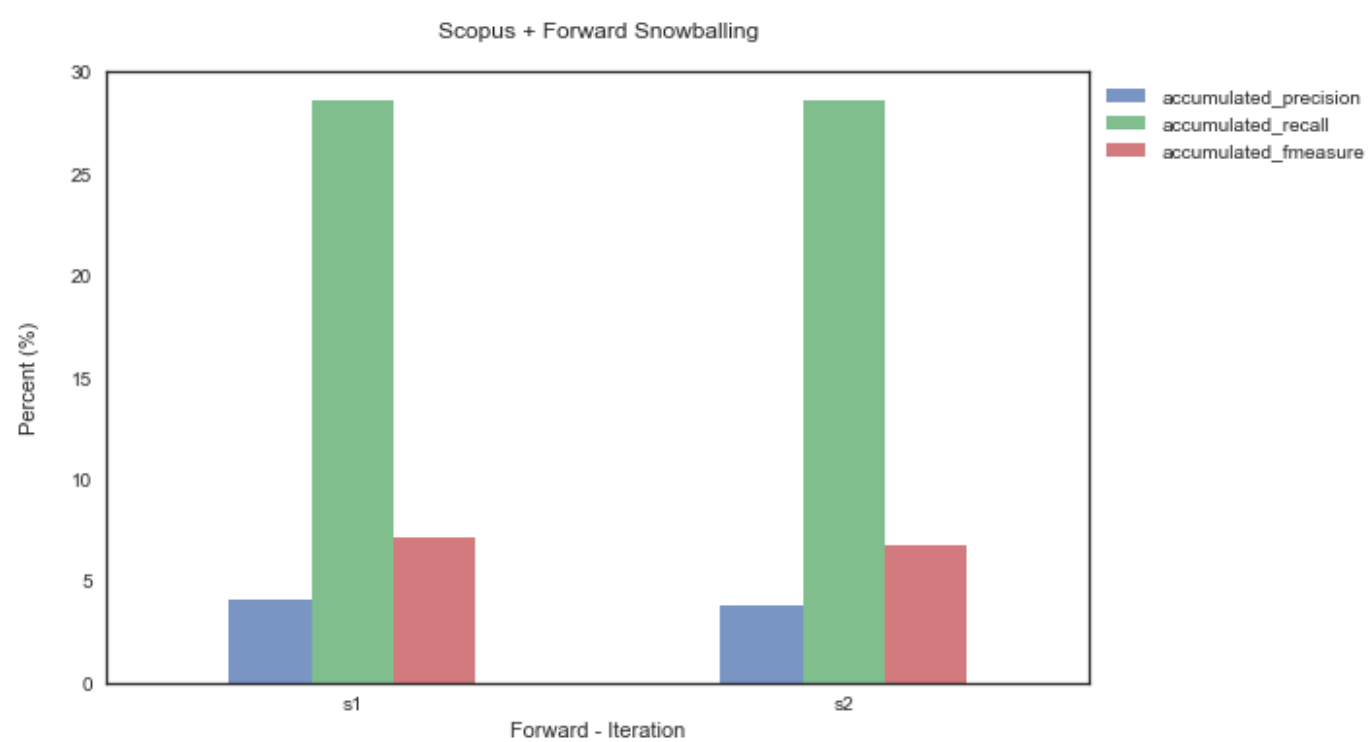
### Report Diagrama de Venn

Backward ['lee2008a', 'lee2009a', 'soydan2006a', 'liao2005a', 'rungratri2008a']  
Forward ['soydan2012a']

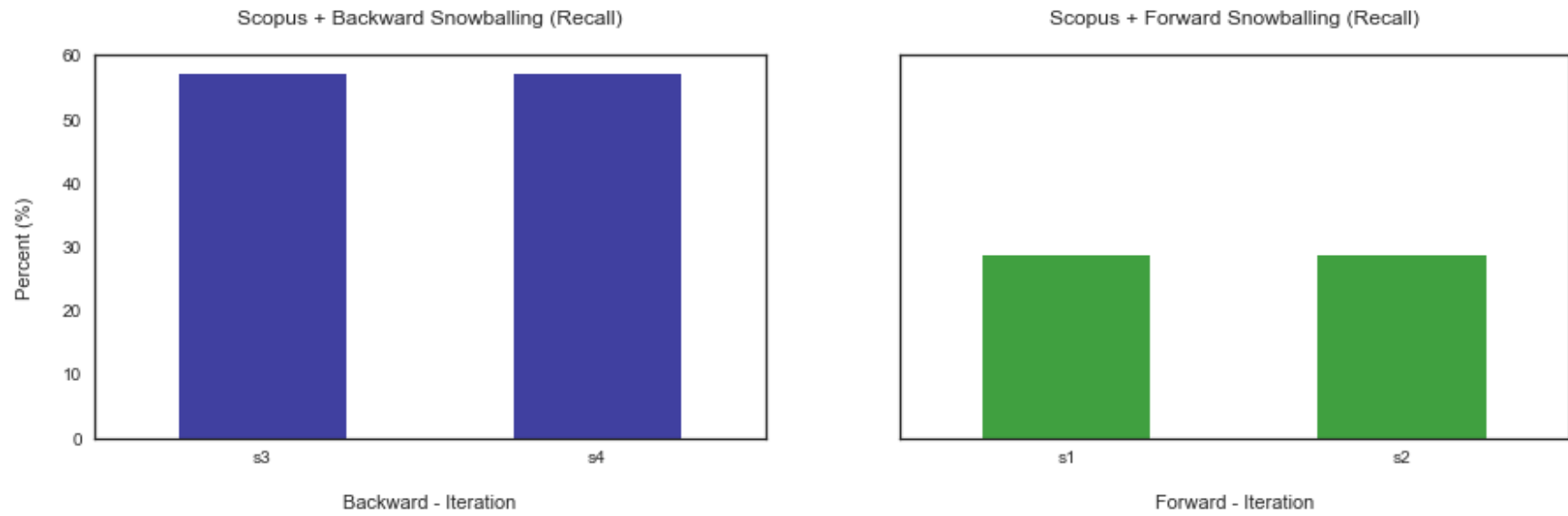
### Bar Chart Strategy 5



### Bar Chart Strategy 5

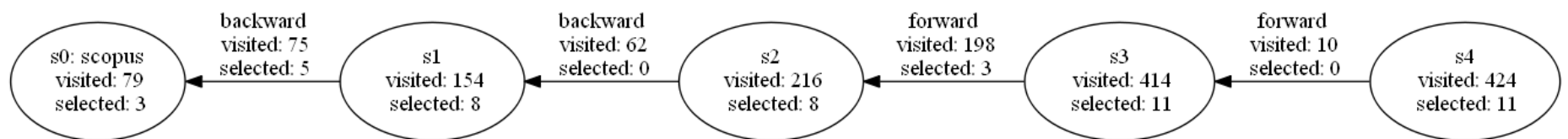


## Bar Chart Strategy 5 (Scopus + BS||FS)



## ▼ 2.6 Strategy 6 - Scopus + Sequential Snowballing (Scopus + BS+FS)

### Provenance Graph - Strategy 6 - Scopus + Sequential Snowballing (Scopus + BS+FS)



### Report Strategy 6 - Scopus + Sequential Snowballing (Scopus + BS+FS)

Total of selected studies in the SLR = 14

Precision = Selected/ Visited

Recall = Selected/ Total of selected studies in the SLR

F-Measure = Harmonic Mean of Precision and Recall

Out[57]:

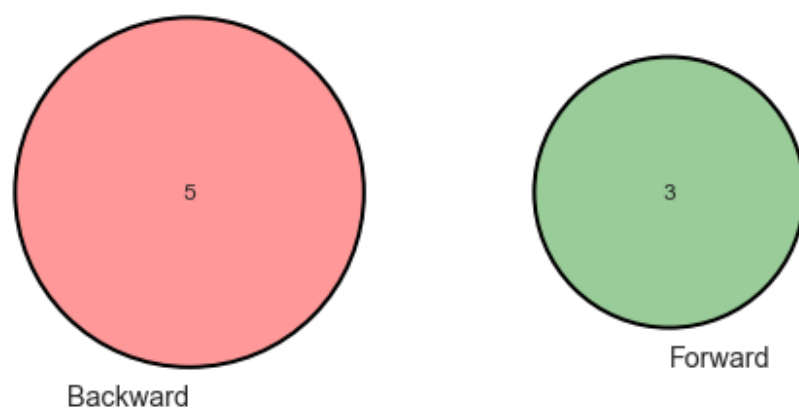
Scopus=s0 /State	Delta Visited	Delta Selected	Delta Precision%	Delta Recall%	Delta F_Measure%	Operation	Accumulated Visited	Accumulated Selected	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%
s0: scopus	79	3	3.80	21.43	6.45	-	79	3	3.80	21.43	6.45
s1	75	5	6.67	35.71	11.24	backward	154	8	5.19	57.14	9.52
s2	62	0	0.00	0.00	0.00	backward	216	8	3.70	57.14	6.96
s3	198	3	1.52	21.43	2.83	forward	414	11	2.66	78.57	5.14
s4	10	0	0.00	0.00	0.00	forward	424	11	2.59	78.57	5.02

### Report Strategy 6 - Measures of Strategy (accumulated)

Out[58]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
Scopus + BS+FS	424	11	2.59	78.57	5.02

### Diagrama de Venn - Strategy 6



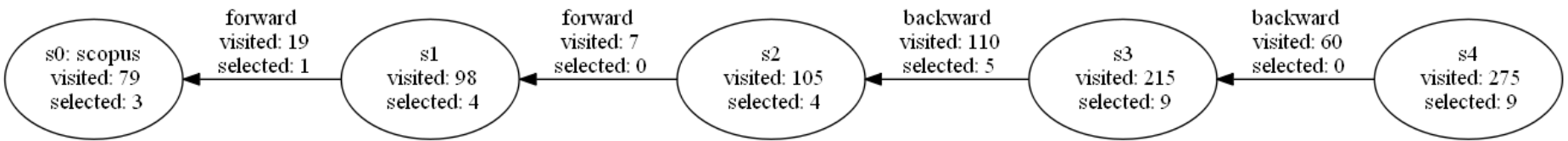
### Report Diagrama de Venn

Backward ['lee2008a', 'lee2009a', 'soydan2006a', 'liao2005a', 'rungratri2008a']

Forward ['grambow2012a', 'soydan2012a', 'grambow2013a']

## ▼ 2.7 Strategy 7 - Scopus + Sequential Snowballing (Scopus + FS+BS)

Provenance Graph - Strategy 7 - Scopus + Sequential Snowballing (Scopus + FS+BS)



Report Strategy 7 - Scopus + Sequential Snowballing (Scopus + FS+BS)

Total of selected studies in the SLR = 14

Precision = Selected/ Visited  
Recall = Selected/ Total of selected studies in the SLR  
F-Measure = Harmonic Mean of Precision and Recall

Out[63]:

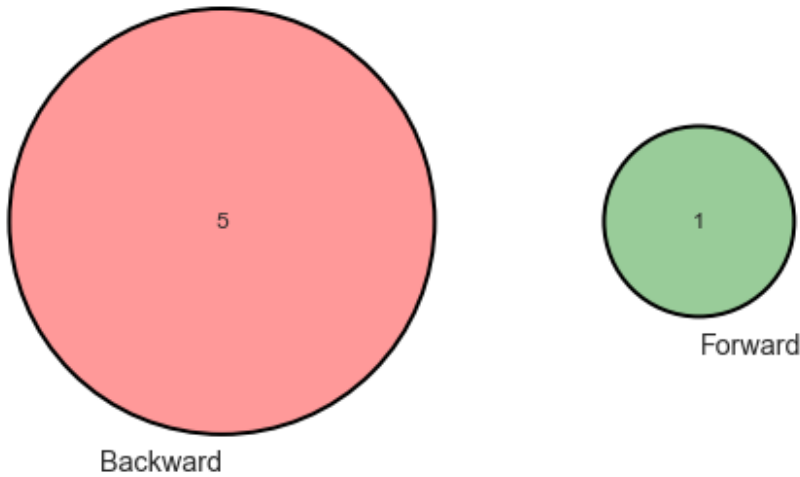
Scopus=s0 /State	Delta Visited	Delta Selected	Delta Precision%	Delta Recall%	Delta F_Measure%	Operation	Accumulated Visited	Accumulated Selected	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%
s0: scopus	79	3	3.80	21.43	6.45	-	79	3	3.80	21.43	6.45
s1	19	1	5.26	7.14	6.06	forward	98	4	4.08	28.57	7.14
s2	7	0	0.00	0.00	0.00	forward	105	4	3.81	28.57	6.72
s3	110	5	4.55	35.71	8.06	backward	215	9	4.19	64.29	7.86
s4	60	0	0.00	0.00	0.00	backward	275	9	3.27	64.29	6.23

Report Strategy 7 - Measures of Strategy (accumulated)

Out[64]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
Scopus + FS+BS	275	9	3.27	64.29	6.23

Diagrama de Venn - Strategy 7



Report Diagrama de Venn

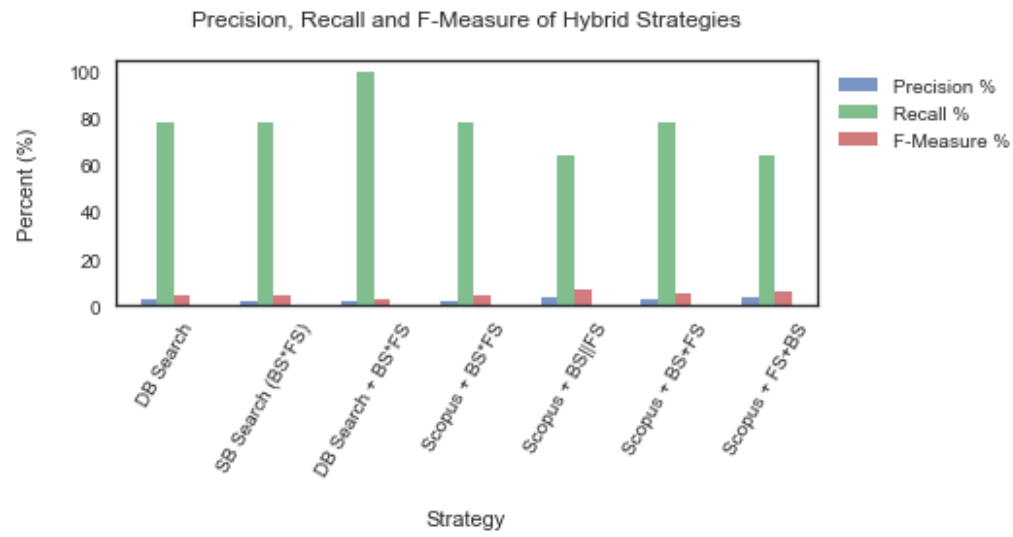
Backward ['lee2008a', 'lee2009a', 'soydan2006a', 'liao2005a', 'rungratri2008a']  
Forward ['soydan2012a']

▼ 3 Analyses

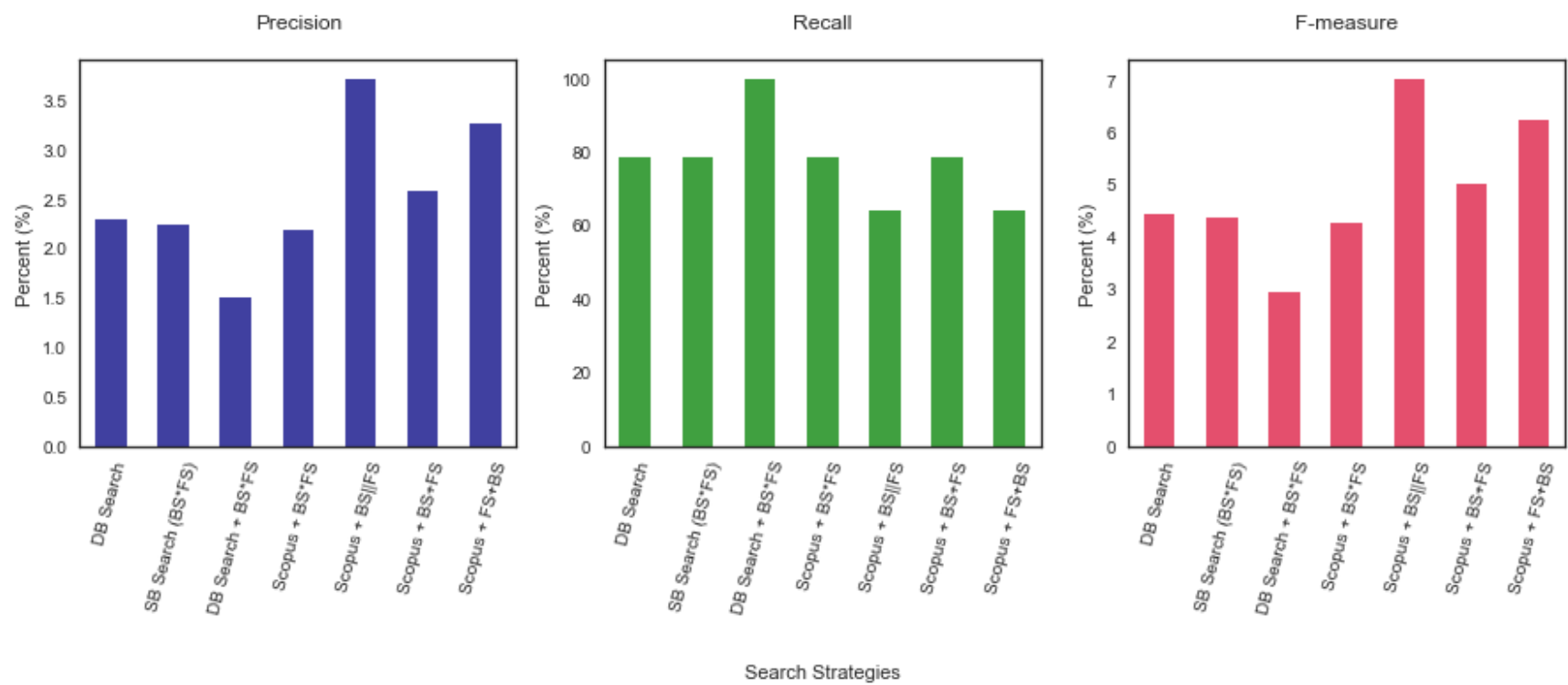
Out[68]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
DB Search	480	11	2.29	78.57	4.45
SB Search (BS*FS)	489	11	2.25	78.57	4.37
DB Search + BS*FS	932	14	1.50	100.00	2.96
Scopus + BS*FS	502	11	2.19	78.57	4.26
Scopus + BS  FS	242	9	3.72	64.29	7.03
Scopus + BS+FS	424	11	2.59	78.57	5.02
Scopus + FS+BS	275	9	3.27	64.29	6.23

## Bar Chart Strategies



## Bar Chart Strategies



## ▼ 4 Research Questions

RQ1) Which of the digital libraries used in the published SLR is more efficient?

Out[75]:

Digital Library	Visited	Selected	Precision %	Recall %	F-Measure %
acm	0	0	nan	0.00	0.00
googlescholar	466	11	2.36	78.57	4.58
ieee	0	0	nan	0.00	0.00
sciencedirect	21	0	0.00	0.00	0.00
scopus	79	3	3.80	21.43	6.45
springer	65	1	1.54	7.14	2.53
webofscience	0	0	nan	0.00	0.00
wiley	15	0	0.00	0.00	0.00

RQ2) Which of the hybrid strategies is more efficient?

Out[76]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
SB Search (BS*FS)	489	11	2.25	78.57	4.37
DB Search + BS*FS	932	14	1.50	100.00	2.96
Scopus + BS*FS	502	11	2.19	78.57	4.26
Scopus + BS  FS	242	9	3.72	64.29	7.03
Scopus + BS+FS	424	11	2.59	78.57	5.02
Scopus + FS+BS	275	9	3.27	64.29	6.23

RQ3) Which of the strategies is more efficient?

Out[77]:

Strategy	Visited	Selected	Precision %	Recall %	F-Measure %
DB Search	480	11	2.29	78.57	4.45
SB Search (BS*FS)	489	11	2.25	78.57	4.37
DB Search + BS*FS	932	14	1.50	100.00	2.96
Scopus + BS*FS	502	11	2.19	78.57	4.26
Scopus + BS  FS	242	9	3.72	64.29	7.03
Scopus + BS+FS	424	11	2.59	78.57	5.02
Scopus + FS+BS	275	9	3.27	64.29	6.23

RQ4) How many selected articles does the digital library find through the direct search for the title of the article?

Total of selected studies in the SLR = 14

Out[78]:

Digital Library	Selected	Recall %
acm	0	0.00
googlescholar	14	100.00
ieee	3	21.43
sciencedirect	1	7.14
scopus	7	50.00
springer	3	21.43
webofscience	5	35.71
wiley	0	0.00