1 Investigating Hybrid Strategies for Systematic Literature Review
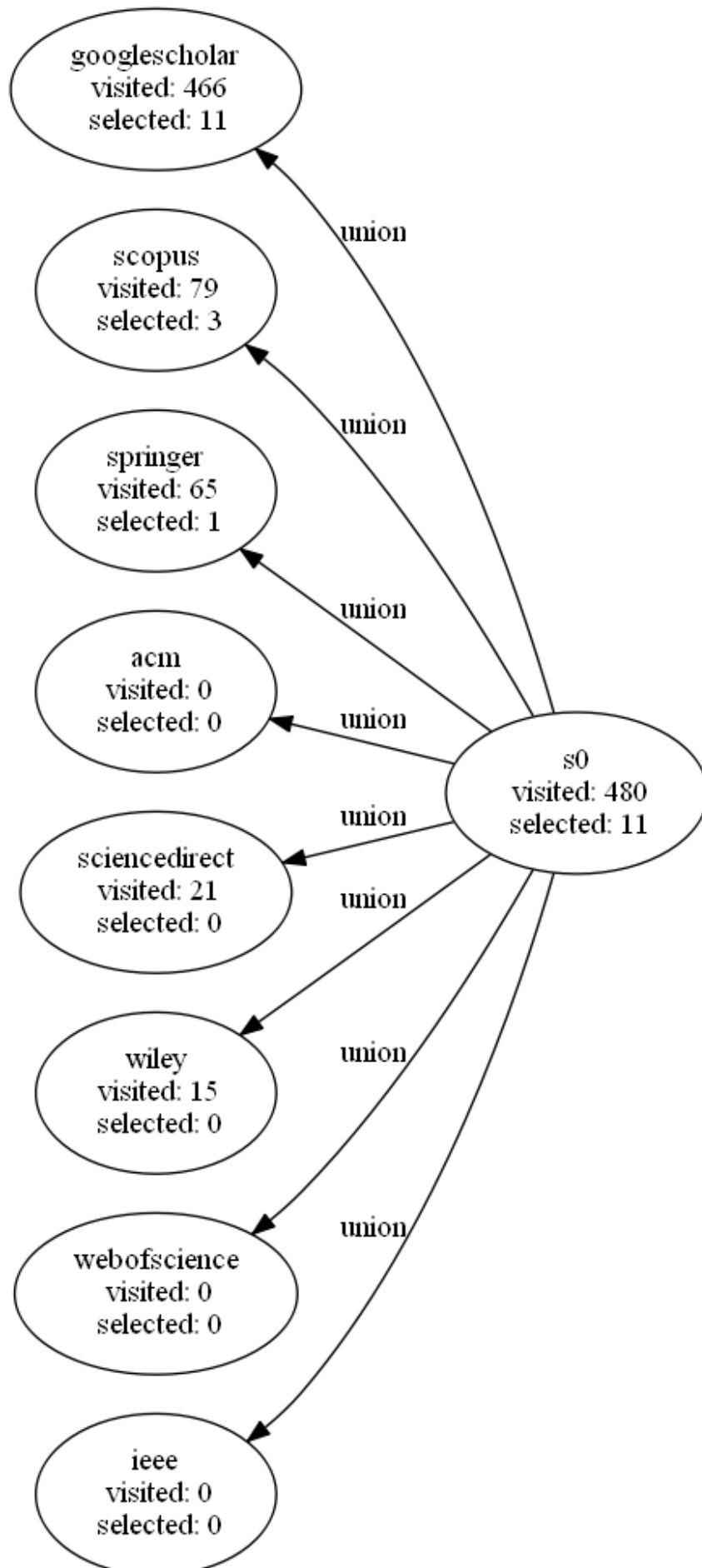
Experiment 3

2 Strategies

2.1 Strategy 1 - Database Search

Total de estudos primários reproduzidos = 11 do Seed Set + 3 encontrados durante o Snowballing = 14
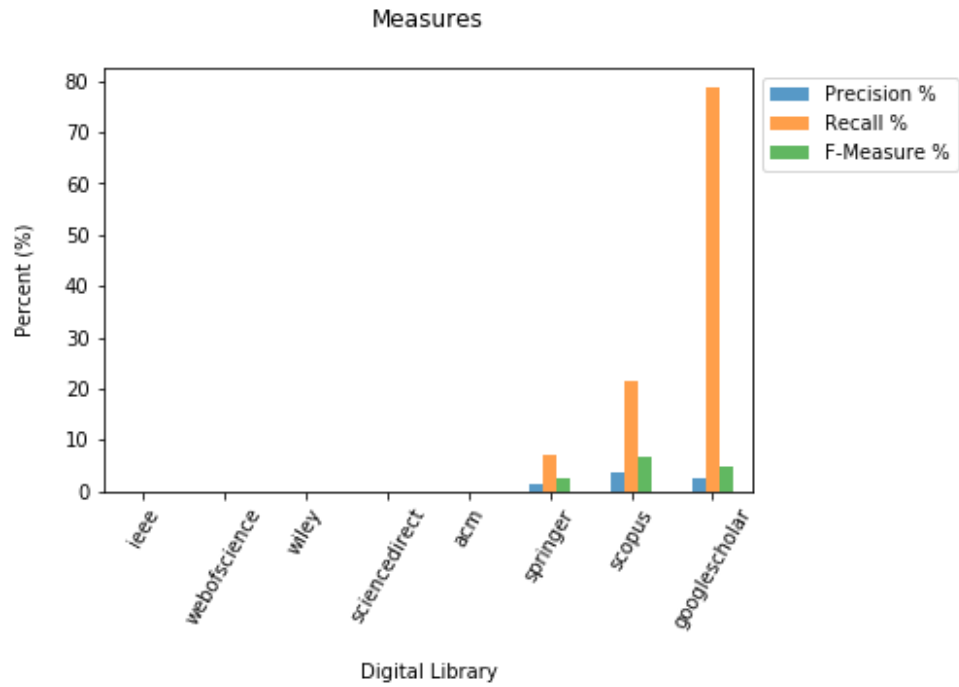
Provenance Graph - Strategy 1 - Database Search

Report Strategy 1 - Database Search

Digital Library	Precision %	Recall %	F-Measure %
ieee	nan	0	0
webofscience	nan	0	0
wiley	0	0	0
sciencedirect	0	0	0
acm	nan	0	0
springer	1.5	7.1	2.5
scopus	3.8	21.4	6.5
googlescholar	2.4	78.6	4.6

Bar Chart Strategy 1

Report Strategy 1 Measures (Accumulated)

Precision %	Recall %	F-Measure %	Visited	Selected
2.3	78.6	4.5	480	11

Report Strategy 1 - Excel and Duplicated Included

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

Bar Chart Publications Type - Strategy 1

Publication Type of Selected
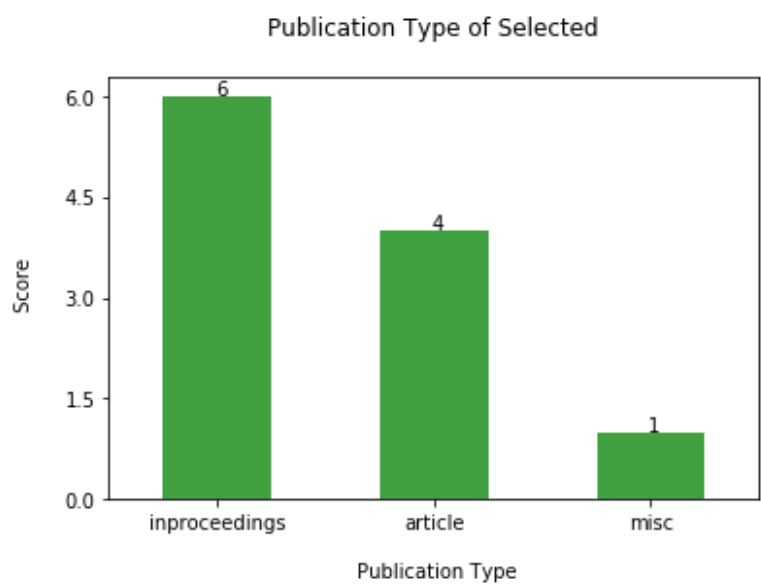
Bar Chart Publications Year - Strategy 1
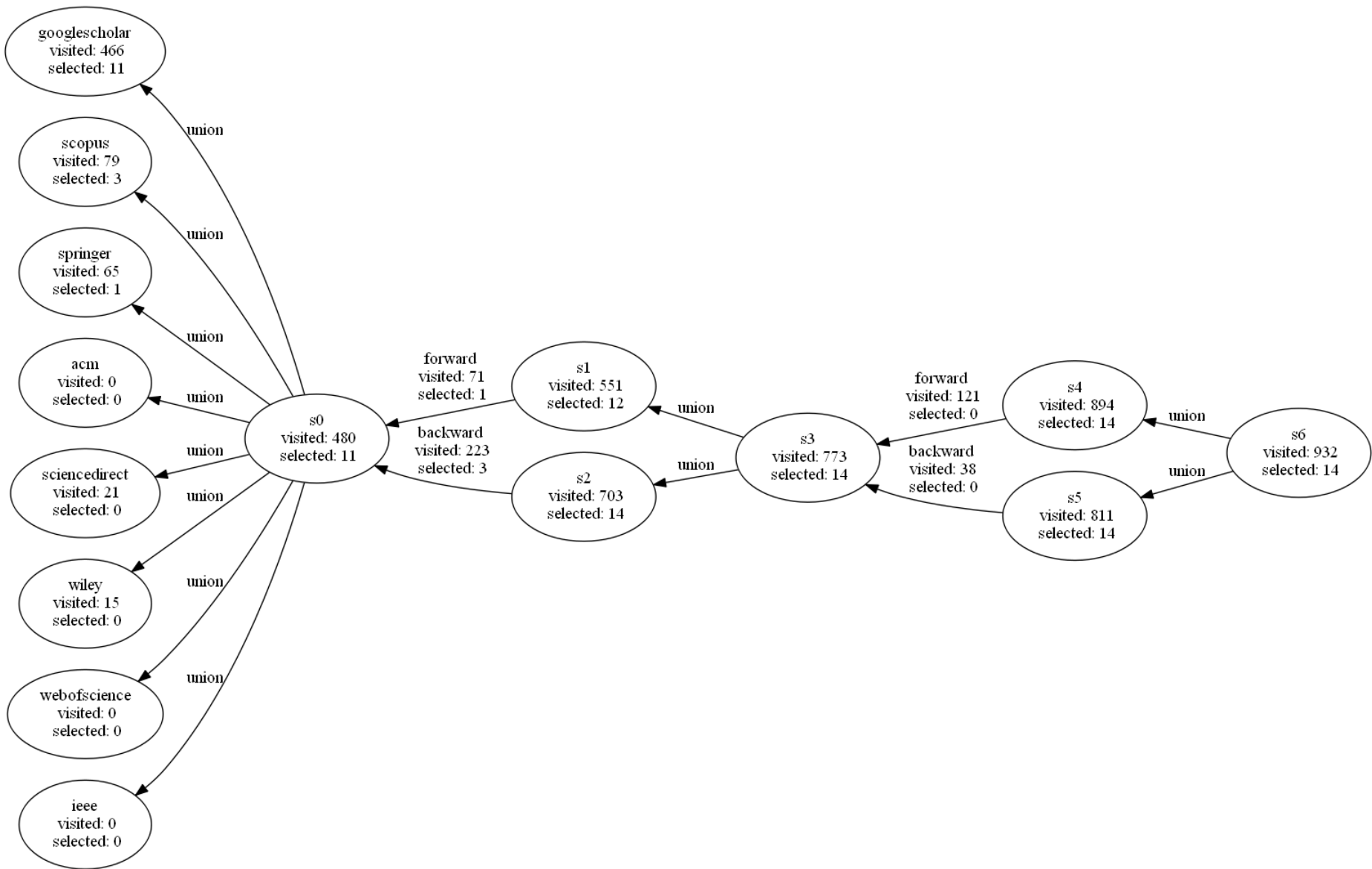
Publication Year of Selected
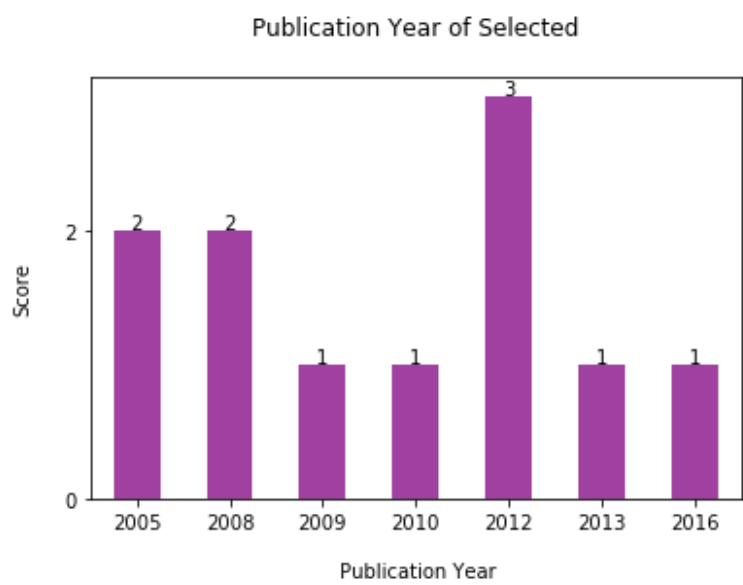
▼ 2.2 Strategy 2 - Database Search + Snowballing (Guideline Wohlin)

Provenance Graph - Strategy 2 - Database Search + Snowballing (Guideline Wohlin)

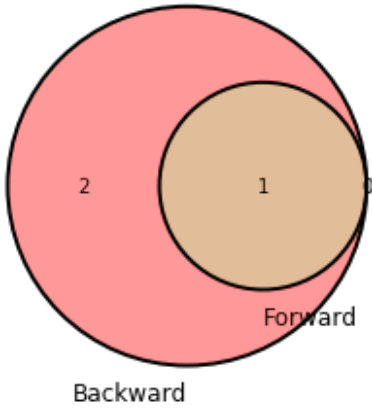**Report Strategy 2 - Database Search + Snowballing (Guideline Wohlin)**

Digital Library/State	Precision%	Recall%	FMeasure%	Operation	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%	Delta Visited	Visited	Delta Related	Related
ieee	nan	0	0	-	0	0	0	0	0	0	0
webofscience	nan	0	0	-	0	0	0	0	0	0	0
wiley	0	0	0	-	0	0	0	15	15	0	0
sciencedirect	0	0	0	-	0	0	0	21	21	0	0
acm	nan	0	0	-	1.5	0	0	0	0	0	0
springer	1.5	7.1	2.5	-	1.5	7.1	2.5	65	65	1	1
scopus	3.8	21.4	6.5	-	3.8	21.4	6.5	79	79	3	3
googlescholar	2.4	78.6	4.6	-	2.4	78.6	4.6	466	466	11	11
s0	nan	0	0	union	2.3	78.6	4.5	0	480	0	11
s2	1.3	21.4	2.5	backward	2	100	3.9	223	703	3	14
s1	1.4	7.1	2.4	forward	2.2	85.7	4.2	71	551	1	12
s3	nan	0	0	union	1.8	100	3.6	0	773	0	14
s5	0	0	0	backward	1.7	100	3.4	38	811	0	14
s4	0	0	0	forward	1.6	100	3.1	121	894	0	14
s6	nan	0	0	union	1.5	100	3	0	932	0	14

Report Strategy 2 - Measures (Accumulated)

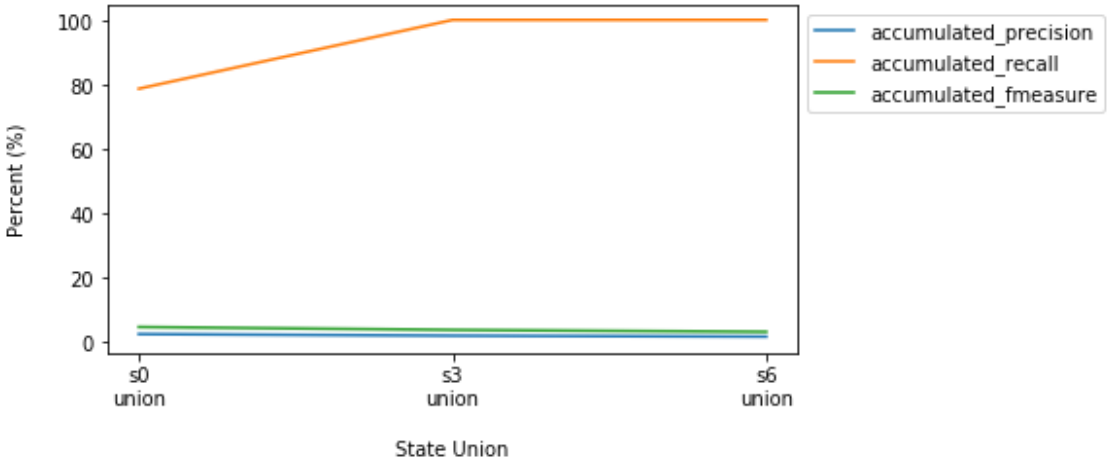| Precision %	Recall %	F-Measure %	Visited	Selected
1.5	100	3	932	14

Diagrama de Venn - Strategy 2
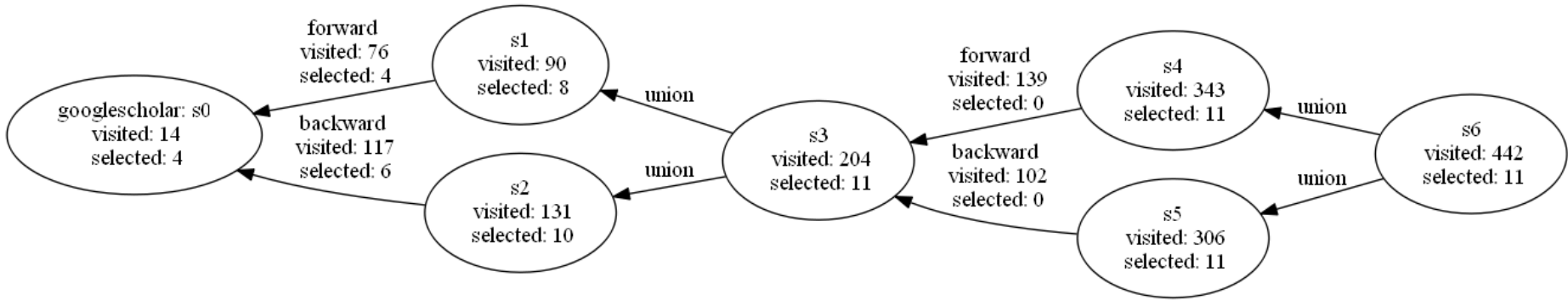

Report Diagrama de Venn

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

Accumulated Measures - Strategy 2

2.3 Strategy 3 - Informal Search (Google Scholar) + Snowballing (Guideline Wohlin)

Provenance Graph - Strategy 3 - Informal Search (Google Scholar) + Snowballing (Guideline Wohlin)

Report Strategy 3 - Informal Search (Google Scholar) + Snowballing (Guideline Wohlin)
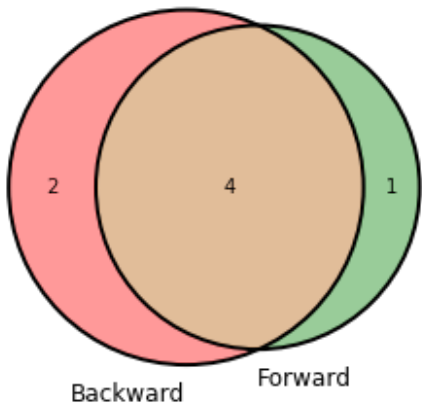
Out[25]:

Scholar=s0 /State	Precision%	Recall%	FMeasure%	Operation	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%	Delta Visited	Visited	Delta Related	Related
googlescholar: s0	28.6	28.6	28.6	-	28.6	28.6	28.6	14	14	4	4
s2	5.1	42.9	9.2	backward	7.6	71.4	13.8	117	131	6	10
s1	5.3	28.6	8.9	forward	8.9	57.1	15.4	76	90	4	8
s3	nan	0	0	union	5.4	78.6	10.1	0	204	0	11
s5	0	0	0	backward	3.6	78.6	6.9	102	306	0	11
s4	0	0	0	forward	3.2	78.6	6.2	139	343	0	11
s6	nan	0	0	union	2.5	78.6	4.8	0	442	0	11

Report Strategy 3 - Measures (Accumulated)

Out[26]:

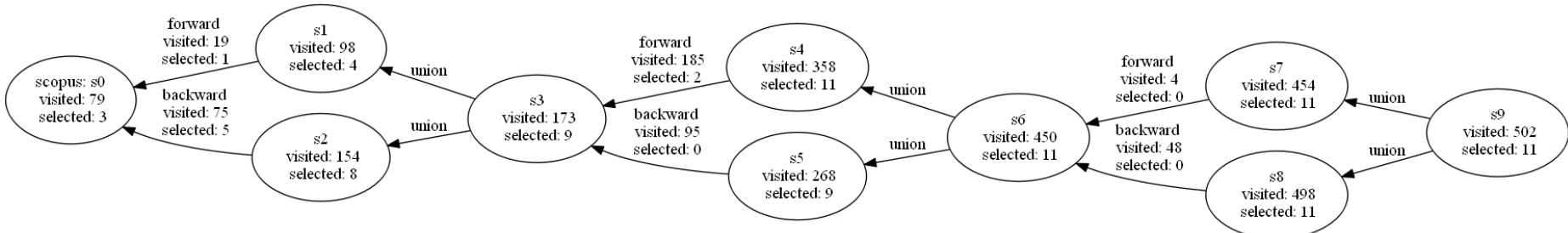| Precision %	Recall %	F-Measure %	Visited	Selected
2.5	78.6	4.8	442	11

Diagrama de Venn - Strategy 3

Report Diagrama de Venn

Backward ['lee2009a', 'gazel2009a', 'soydan2006a', 'grambow2012a', 'rungratri2008a', 'lee2008a']
Forward ['soydan2012a', 'gazel2009a', 'grambow2012a', 'soydan2006a', 'rungratri2008a']

2.4 Strategy 4 - Scopus + Snowballing (Guideline Wohlin)

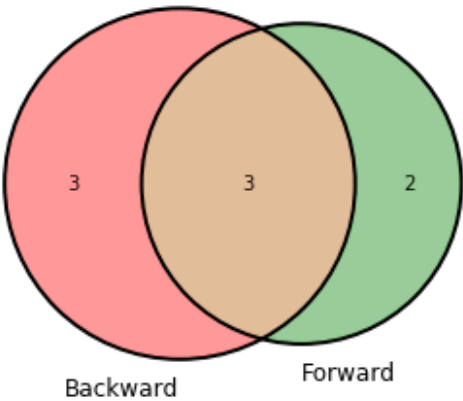Provenance Graph - Strategy 4 - Scopus + Snowballing (Guideline Wohlin)

Out[31]:

Scopus=s0 /State	Precision%	Recall%	FMeasure%	Operation	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%	Delta Visited	Visited	Delta Related	Related
scopus: s0	3.8	21.4	6.5	-	3.8	21.4	6.5	79	79	3	3
s2	6.7	35.7	11.2	backward	5.2	57.1	9.5	75	154	5	8
s1	5.3	7.1	6.1	forward	4.1	28.6	7.1	19	98	1	4
s3	nan	0	0	union	5.2	64.3	9.6	0	173	0	9
s5	0	0	0	backward	3.4	64.3	6.4	95	268	0	9
s4	1.1	14.3	2	forward	3.1	78.6	5.9	185	358	2	11
s6	nan	0	0	union	2.4	78.6	4.7	0	450	0	11
s8	0	0	0	backward	2.2	78.6	4.3	48	498	0	11
s7	0	0	0	forward	2.4	78.6	4.7	4	454	0	11
s9	nan	0	0	union	2.2	78.6	4.3	0	502	0	11

Report Strategy 4 - Measures (Accumulated)

Out[32]:

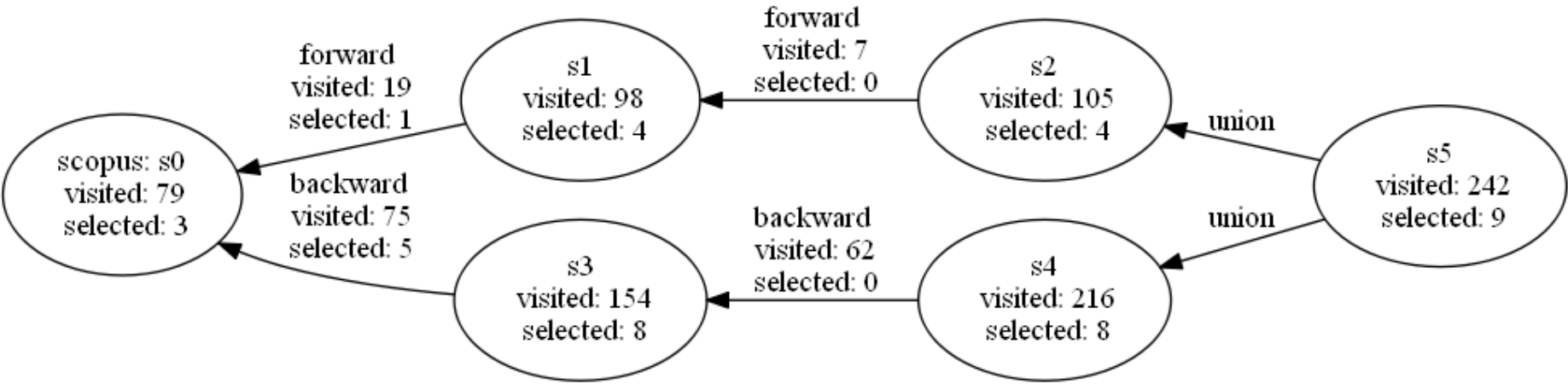| Precision %	Recall %	F-Measure %	Visited	Selected
2.2	78.6	4.3	502	11

Diagrama de Venn - Strategy 4

Report Diagrama de Venn

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

▼ 2.5 Strategy 5 - Scopus + Snowballing (Short Paper)

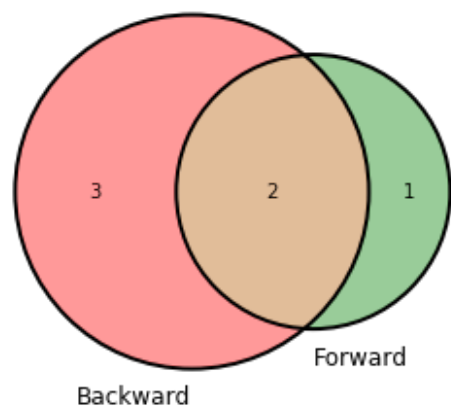Provenance Graph - Strategy 5 - Scopus + Snowballing (Short Paper)

Out[37]:

Scopus=s0 /State	Precision%	Recall%	FMeasure%	Operation	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%	Delta Visited	Visited	Delta Related	Related
scopus: s0	3.8	21.4	6.5	-	3.8	21.4	6.5	79	79	3	3
s3	6.7	35.7	11.2	backward	5.2	57.1	9.5	75	154	5	8
s1	5.3	7.1	6.1	forward	4.1	28.6	7.1	19	98	1	4
s4	0	0	0	backward	3.7	57.1	7	62	216	0	8
s2	0	0	0	forward	3.8	28.6	6.7	7	105	0	4
s5	nan	0	0	union	3.7	64.3	7	0	242	0	9

Report Strategy 5 - Measures (Accumulated)

Out[38]:

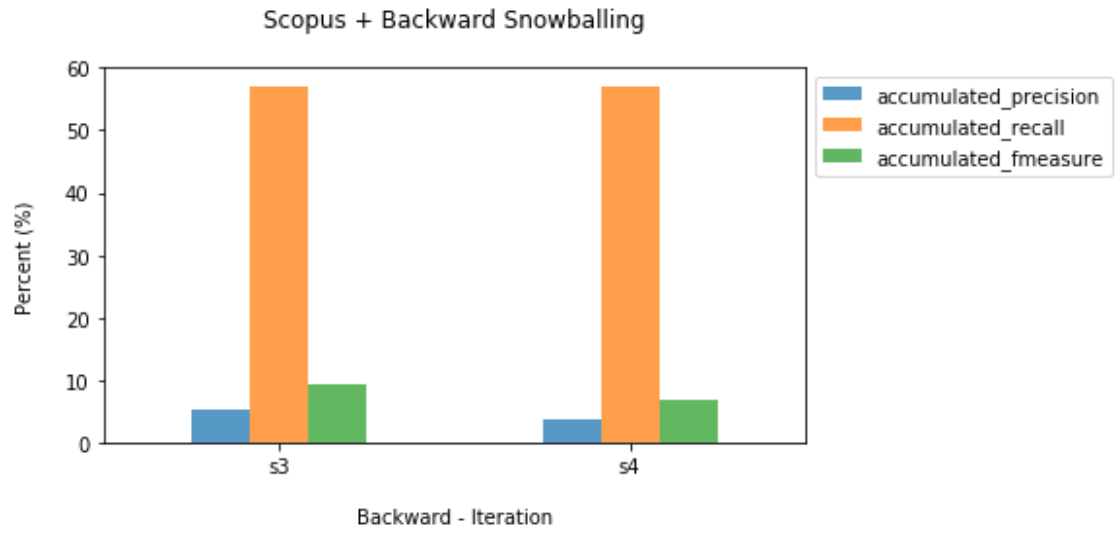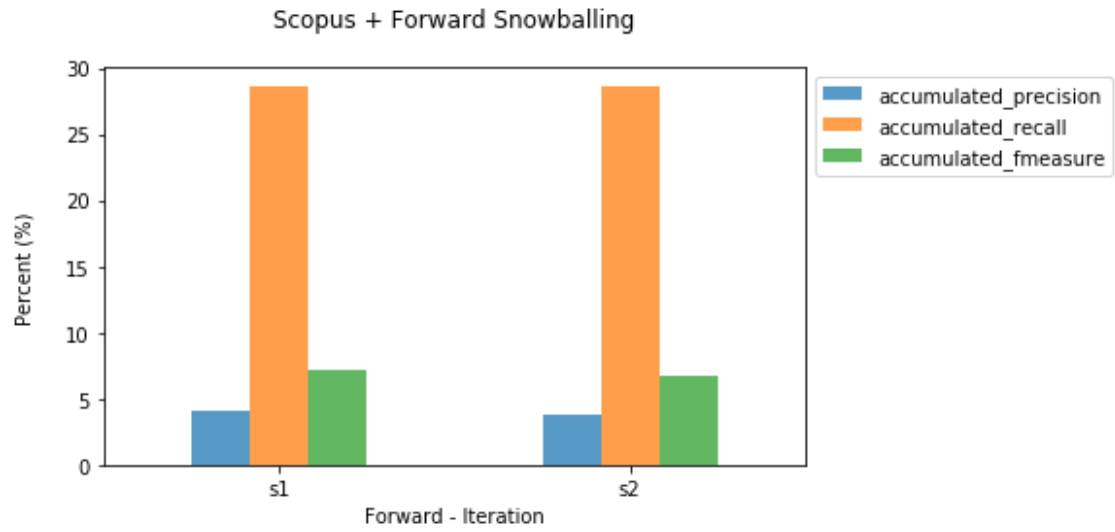| Precision %	Recall %	F-Measure %	Visited	Selected
3.7	64.3	7	242	9

Diagrama de Venn - Strategy 5

Report Diagrama de Venn

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

Bar Chart Strategy 5

Bar Chart Strategy 5

2.6 Strategy 6 - Scopus + Snowballing (JF BF)

Provenance Graph - Strategy 6 - Scopus + Snowballing (JF BF)

Report Strategy 6 - Scopus + Snowballing (JF BF)
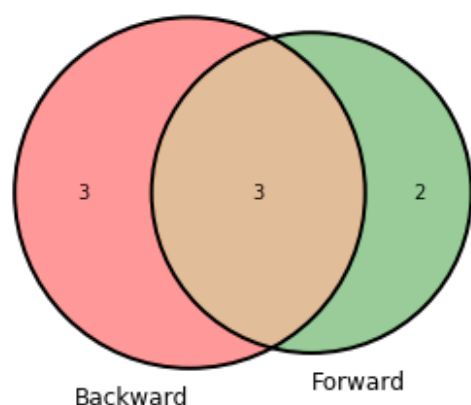
Out[45]:

Scopus=s0 /State	Precision%	Recall%	FMeasure%	Operation	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%	Delta Visited	Visited	Delta Related	Related
scopus: s0	3.8	21.4	6.5	-	3.8	21.4	6.5	79	79	3	3
s1	6.7	35.7	11.2	backward	5.2	57.1	9.5	75	154	5	8
s2	0	0	0	backward	3.7	57.1	7	62	216	0	8
s3	1.5	21.4	2.8	forward	2.7	78.6	5.1	198	414	3	11
s4	0	0	0	forward	2.6	78.6	5	10	424	0	11

Report Strategy 6 - Measures (Accumulated)

Out[46]:

Precision %	Recall %	F-Measure %	Visited	Selected
2.6	78.6	5	424	11

Diagrama de Venn - Strategy 6

Report Diagrama de Venn

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

2.7 Strategy 7 - Scopus + Snowballing (JF FB)

Provenance Graph - Strategy 7 - Scopus + Snowballing (JF FB)

Report Strategy 7 - Scopus + Snowballing (JF FB)

Out[51]:

Scopus=s0 /State	Precision%	Recall%	FMeasure%	Operation	Accumulated Precision%	Accumulated Recall%	Accumulated F_Measure%	Delta Visited	Visited	Delta Related	Related
scopus: s0	3.8	21.4	6.5	-	3.8	21.4	6.5	79	79	3	3
s1	5.3	7.1	6.1	forward	4.1	28.6	7.1	19	98	1	4
s2	0	0	0	forward	3.8	28.6	6.7	7	105	0	4
s3	4.5	35.7	8.1	backward	4.2	64.3	7.9	110	215	5	9
s4	0	0	0	backward	3.3	64.3	6.2	60	275	0	9

Report Strategy 7 - Measures (Accumulated)

Precision %	Recall %	F-Measure %	Visited	Selected
3.3	64.3	6.2	275	9

**Diagrama de Venn - Strategy 7**
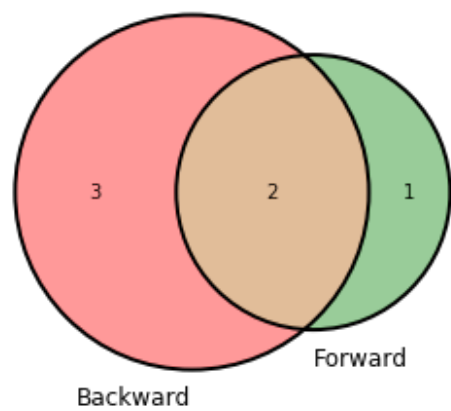
Report Diagrama de Venn

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

3 Analyses

Strategy	Precision %	Recall %	F-Measure %	Visited	Related	Final Selected
E1	2.3	78.6	4.5	480	11	11
E2	1.5	100	3	932	14	14
E3	2.5	78.6	4.8	442	11	11
E4	2.2	78.6	4.3	502	11	11
E5	3.7	64.3	7	242	9	9
E6	2.6	78.6	5	424	11	11
E7	3.3	64.3	6.2	275	9	9

Bar Chart Strategies

Precision, Recall and F-Measure of Hybrid Strategies
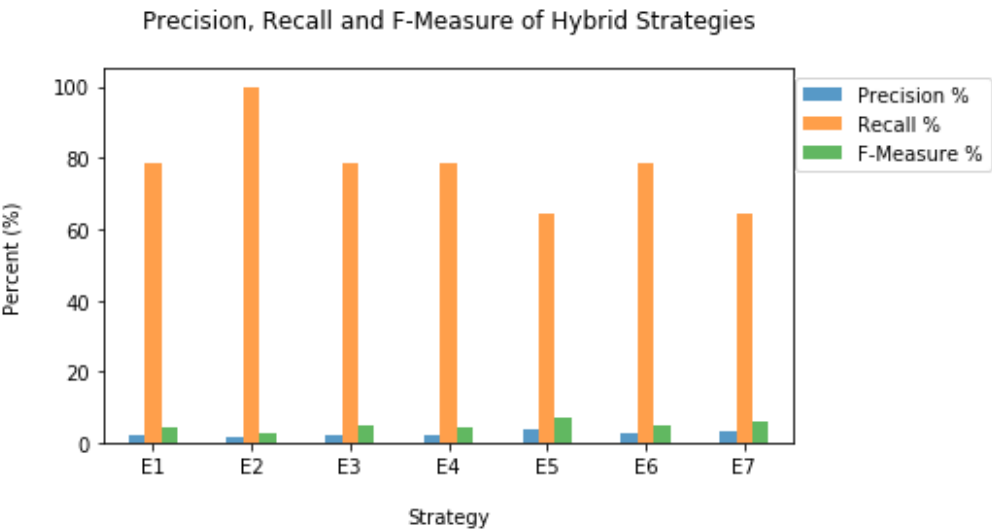
4 Research Questions

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

Out[61]:

Digital Library	Precision %	Recall %	F-Measure %
ieee	nan	0	0
webofscience	nan	0	0
wiley	0	0	0
sciencedirect	0	0	0
acm	nan	0	0
springer	1.5	7.1	2.5
scopus	3.8	21.4	6.5
googlescholar	2.4	78.6	4.6

RQ2) Which of the hybrid strategies is more efficient?

Out[62]:

Strategy	Precision %	Recall %	F-Measure %
E2	1.5	100	3
E3	2.5	78.6	4.8
E4	2.2	78.6	4.3
E5	3.7	64.3	7
E6	2.6	78.6	5
E7	3.3	64.3	6.2

RQ3) Which of the strategies is more efficient?

Out[63]:

Strategy	Precision %	Recall %	F-Measure %
E1	2.3	78.6	4.5
E2	1.5	100	3
E3	2.5	78.6	4.8
E4	2.2	78.6	4.3
E5	3.7	64.3	7
E6	2.6	78.6	5
E7	3.3	64.3	6.2

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

Out[64]:

Digital Library	Recall %
scopus	50
springer	21.4
wiley	0
sciencedirect	7.1
acm	0
webofscience	35.7
ieee	21.4
googlescholar	100