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Sustainability Rating System For Construction Corporation:
A Best Practice Review

Yujie Lu and Qingbin Cui
University of Maryland

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1. Sustainability Rating System (SRS) Review

Table 1 Sustainability Rating System (SRS) In Construction Industry

A List of SRS for construction projects					
Name	Objective	Developer/Owner	Operator	Certification Type	Initial Year
LEED	Buildings	U.S. Green Building Council	Third-Party Certification	Four-Level Classification	1998
Green Globes	Buildings	Green Building Initiative(USA) BOMA, ECD Jones Lang Lasalle (Canada)	Third-Party Certification	One-to-four Globes Rating	2000
GreenLITES	Transportation	New York State Department Of Transportation	Self-certification	Four-level Certification	N/A
I-LAST	Transportation	Illinois Department Of Transportation, American Council Of Engineering Companies–Illinois, Illinois Road And Transportation Builders Association.	Project team	Point System	2010
Greenroads	ROAD	University Of Washington And CH2M HILL	Project team	4-level Certification	2010
B List of SRS for construction professionals					
LEED Professional Credentials	Green Building Professionals	U.S. Green Building Council, Green Building Certification Institute	LEED Green Associate Exam	Six Classified Certification	2001
GACPs	Building-Related Practitioners	Green Advantage, Inc.	Green Advantage Certification Exam	Three Classified Certification	2001
C List of SRS for construction corporations					
Green Contractor Certification	US Contractor	Associated Builders And Contractors (ABC)	Third-Party Assessor	Certification	N/A
Top Green Contractor	US Contractor	Engineering News-Record (ENR)	ENR	Top 100 Ranking	2007
Top Design Firm	US Designer	Engineering News-Record (ENR)	ENR	Top 100 Ranking	2008

Table 2 Corporate Sustainability Rating System (SRS) used in other industries

Name	Objects	Developer/ Owner	Evaluation	Certification Type	Initial Year	Current Status
Dow Jones Sustainability Index (DJSI)	General public companies	Dow Jones Indexes and SAM group	SAM	multiple indexes	1999	In 2009 CSA, **26** heavy construction companies and **5** home construction companies
Sustainability Reporting Guideline (SRG)	Organizational reporting system	Global Reporting Initiative	self-evaluation	reporting framework	2000	In 2010, **5** construction companies used this framework (Fluor, Louisianan-Pacific Corporation, Owens Corning, PPG industries).
Wal-Mart Sustainability Assessment	SCM and manufacture organizations	Wal-Mart	Wal-Mart	weighted scorecard survey	2009	15 simple questions, used more than 100,000 suppliers, 2 million associates globally
College Sustainability Report Card (CSRC)	Large-scale facility management and multiple location organizations.	Sustainable Endowments Institute	Sustainable Endowments Institute	grading system from A to F	2007	In 2011, CSRC covered 300 colleges in the fifth U.S. and eight Canadian provinces

2. The SRS for Construction Corporations

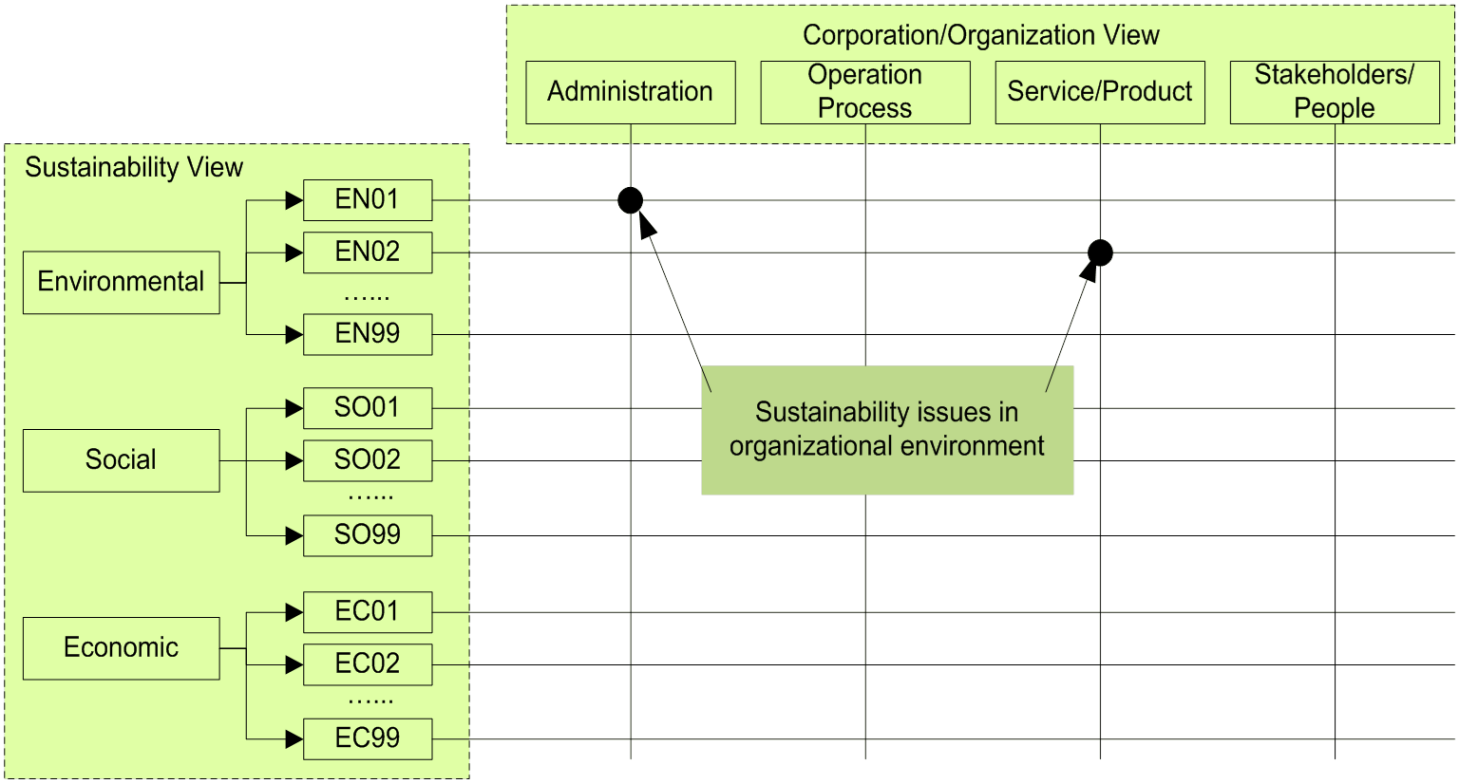


Figure 1 Framework of Sustainability Rating System for Construction Corporation (SRSCC)

No.	Indicators	Source	Company				Existing	Applicable	Type
			AD	OP	S/P	SH			
Environmental									
1	Environmental Reporting: Qualitative And Quantitative	DJSI	√	√			○	Y	CORE
2	Environmental Measurement	Wal	√	√			◐	Y	CORE
3	Commitment To Reduction	Wal	√			√	◐	Y	ADD
4	Climate Strategy	DJSI	√				○	Y	ADD
5	Environmental Policy/ Management System	DJSI\CSRC	√	√			◐	Y	CORE
6	Sustainability Administrative Committee, Office, And Staff	CSRC	√			√	◐	Y	ADD
7	Purchasing Guidelines: Environmental Compliance, Employment Practices, Product Safety	Wal\CSRC	√		√		◐	Y	CORE
8	Resource Conservation And Resource Efficiency	DJSI\CSRC		√			◐	Y	CORE
9	Air Emissions (GHG, CO_2) Measurement, Reporting, Volume, Reduction Targets, Realization	Wal\CSRC\ GRI		√	√		◐	Y	CORE
10	Water Management: Volumes, Reduction Targets	Wal\GRI		√	√		◐	Y	CORE
11	Water Recycled And Reused	GRI		√	√		○	Y	CORE
12	Solid Waste: Amounts, Reduction Targets	Wal\CSRC		√	√		◐	Y	CORE
13	Hazardous Waste: Transported, Imported, Exported, Treated	GRI		√	√		○	Y	CORE
14	Materials Management: Volume, Recycling	GRI\CSRC		√	√		◐	Y	CORE
15	Spill: Numbers And Volumes	GRI		√			○	N/A	-
16	Energy Consumption: Direct And Indirect	GRI		√	√		●	Y	CORE
17	Energy Efficiency And Conservation	CSRC\GRI		√	√		◐	Y	CORE
18	Renewable Energy Generation/Purchase	CSRC\GRI		√	√		○	Y	CORE
19	Initiatives To Reduce Energy Consumption	GRI	√	√			●	Y	ADD
20	The 3rd Party Certifications Product	Wal	√		√		●	Y	CORE
21	Transport And Logistics For Product	DJSI\GRI		√	√		●	Y	ADD
22	Local Transportation Alternatives For People: Bicycle, Car-Sharing	CSRC		√		√	●	Y	ADD
23	Green Building: Design, Construction, Operations, And Maintenance	CSRC			√		●	Y	CORE
24	Building Adaptive Reuse	CSRC		√	√		○	Y	CORE
25	Operational Eco-Efficiency	DJSI		√	√		◐	Y	ADD
26	On-Site Combustion	CSRC		√			○	N/A	-
27	Biodiversity: Land Location, Impacts, Red List Species, Habitats Protected	GRI		√	√		○	Y	CORE
28	Reduce Environmental Impacts Of Products And Services	GRI			√		◐	Y	CORE
29	Compliance With Environmental Laws And Regulations, And Non-Compliance Fines	GRI	√	√	√		○	Y	ADD
30	Total Environmental Protection Expenditures And Investment	GRI	√	√			◐	Y	ADD

No.	Indicators	Source	Company				Existing	Applicable	Type
			AD	OP	S/P	SH			
Social									
1	Corporate Citizenship/ Philanthropy: Contribution, Social Investment Volume	DJSI	√				○	Y	ADD
2	Social Reporting: Qualitative And Quantitative	DJSI	√	√			○	Y	ADD
3	Social (Sustainability) Policies	CSRC	√	√			◐	Y	ADD
4	Social Compliance Management And Improvement	Wal\GRI	√	√			○	Y	ADD
5	Social Integration	DJSI	√	√		√	○	Y	ADD
6	Community Development & Investment	Wal\GRI	√	√			○	Y	ADD
7	Standards for Suppliers	DJSI	√	√		√	◐	Y	CORE
8	The Locations That Produce The Product/Ingredients	Wal		√	√		●	Y	CORE
9	The Quality And Capacity Of Production Manufacturing Partners	Wal		√			◐	Y	CORE
10	Labor Practice Indicators: Diversity, Non-Discrimination, Freedom Of Association, Layoffs, Health\Safety\ Environment (HSE), Grievance Resolution, Public Commitment	DJSI\GRI	√			√	○	Y	ADD
11	Human Capital Development: Skill, Certification, Performance, Learning And Development	DJSI	√			√	◐	Y	ADD
12	Talent Attraction & Retention: Appraisal, Compensation, Communication, Satisfaction	DJSI	√			√	○	Y	ADD
13	Occupational Health & Safety (OHS): Rate Of Injury, Diseases, Lost Days, Absenteeism, Work-Related Fatalities	DJSI GRI	√			√	○	Y	ADD
14	Employee Outreach Opportunities	CSRC				√	○	Y	ADD
15	People Involvement: Sustainability Challenges And Competitions	CSRC	√			√	○	Y	ADD
16	Employment: Type, Contract, Region, Benefit, And Turnover Rate By Age, Gender, Region,	GRI	√			√	○	Y	ADD
17	Labor/Management Relations: Collective Bargaining Agreements, Minimum Notice Periods	GRI	√			√	○	Y	ADD
18	Training And Education: Skills Program And Lifelong Learning	GRI	√			√	●	Y	ADD
19	Diversity And Equal Opportunity: By Gender, Age, Minority Group	GRI	√			√	○	Y	ADD
20	Investment And Procurement On Human Rights	GRI	√	√		√	○	Y	ADD
21	Freedom Of Association And Collective Bargaining	GRI	√			√	○	Y	ADD
22	Child Labor	GRI	√			√	○	Y	ADD
23	Forced And Compulsory Labor	GRI	√			√	○	N/A	-
24	Security Practices	GRI	√	√		√	○	N/A	-
25	Indigenous Rights	GRI	√			√	○	N/A	-
26	Anti-Corruption: Policies, And Procedures, And Risks	GRI	√				○	Y	ADD
27	Public Policy: Development And Lobbying	GRI	√				○	Y	ADD
28	Anti-Competitive, Anti-Trust, And Monopoly Behaviors	GRI	√	√			○	Y	ADD
29	Customer Health And Safety: (Building Air Quality)	GRI		√	√	√	○	Y	ADD
30	Product Service Labeling: Information Required By Procedures	GRI	√	√			○	Y	CORE
31	Market And Communications Adherence To Laws, Standards, Codes	GRI	√	√	√		○	Y	ADD
32	Customer Privacy	GRI	√			√	○	Y	ADD

No.	Indicators	Source	Company				Existing	Applicable	Type
			AD	OP	S/P	SH			
Economic									
1	Codes Of Conduct / Compliance / Corruption & Bribery	DJSI	√	√			○	Y	ADD
2	Corporate Governance: Board Structure And Effectiveness, Transparency, Remuneration	DJSI	√			√	○	Y	ADD
3	Risk & Crisis Management	DJSI	√	√	√		○	Y	ADD
4	Purchasing Guidelines: Environmental Compliance, Employment Practices, Product Safety	Wal	√				◐	Y	CORE
5	Renewable Energy And Sustainable Investment	CSRC		√	√		○	Y	CORE
6	Community Investment	CSRC	√			√	○	Y	ADD
7	Fair Trade Products	CSRC		√	√		○	Y	CORE
8	Local Transportation Alternatives	CSRC		√		√	●	Y	ADD
9	Non-Financial Project Evaluation, Indirect Economic Impacts	DJSI GRI		√	√		○	Y	ADD
10	Customer Relationship Management	DJSI				√	○	Y	ADD
11	Stakeholder Involvement	CSRC	√			√	○	Y	ADD
12	Economic Performance: Value Generated, Benefit, Governmental Financial Assistance	GRI		√			○	Y	ADD
13	Financial Implications And Opportunities Due To Climate Change	GRI	√	√			○	Y	ADD
14	Local Market Presence: Wages, Policy And Spending On Local Suppliers, Hiring Procedures And Proportions	GRI	√	√	√	√	○	Y	ADD
15	Investments And Services Provide for Public Benefit: Commercial, In-Kind, Pro Bono Engagement	GRI	√			√	○	Y	ADD

3. Discussion

(1) A more systematic and comprehensive SRSCC is needed in the construction industry, with more attention paid to social and economic dimensions.

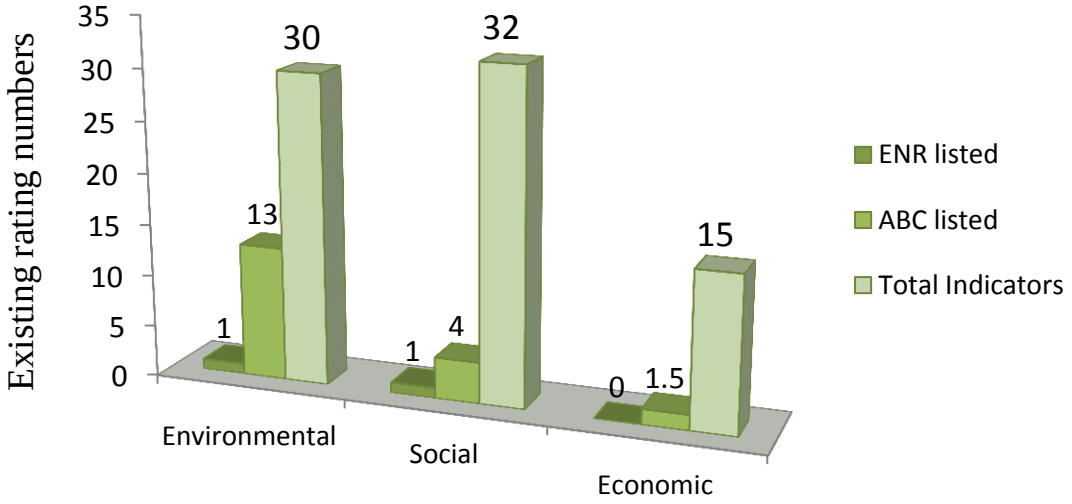


Figure 2 SRSCC sustainable dimensions

	Environmental		Social		Economic		Total	
	number	percentage	number	percentage	number	percentage	number	percentage
Total Indicators	30	100%	32	100%	15	100%	**77**	**100%**
ABC listed	13	43.3%	4	12.5%	1.5	10.0%	**18.5**	**24.0%**
ENR listed	1	3.3%	1	3.1%	0	0.0%	**2**	**2.6%**
Non-mentioned*	16	53.3%	27	84.4%	13.5	90.0%	**56.5**	**73.4%**

(2) Corporate sustainability practices are supported by all dimensions in a construction corporation, especially for the administration and operation process.

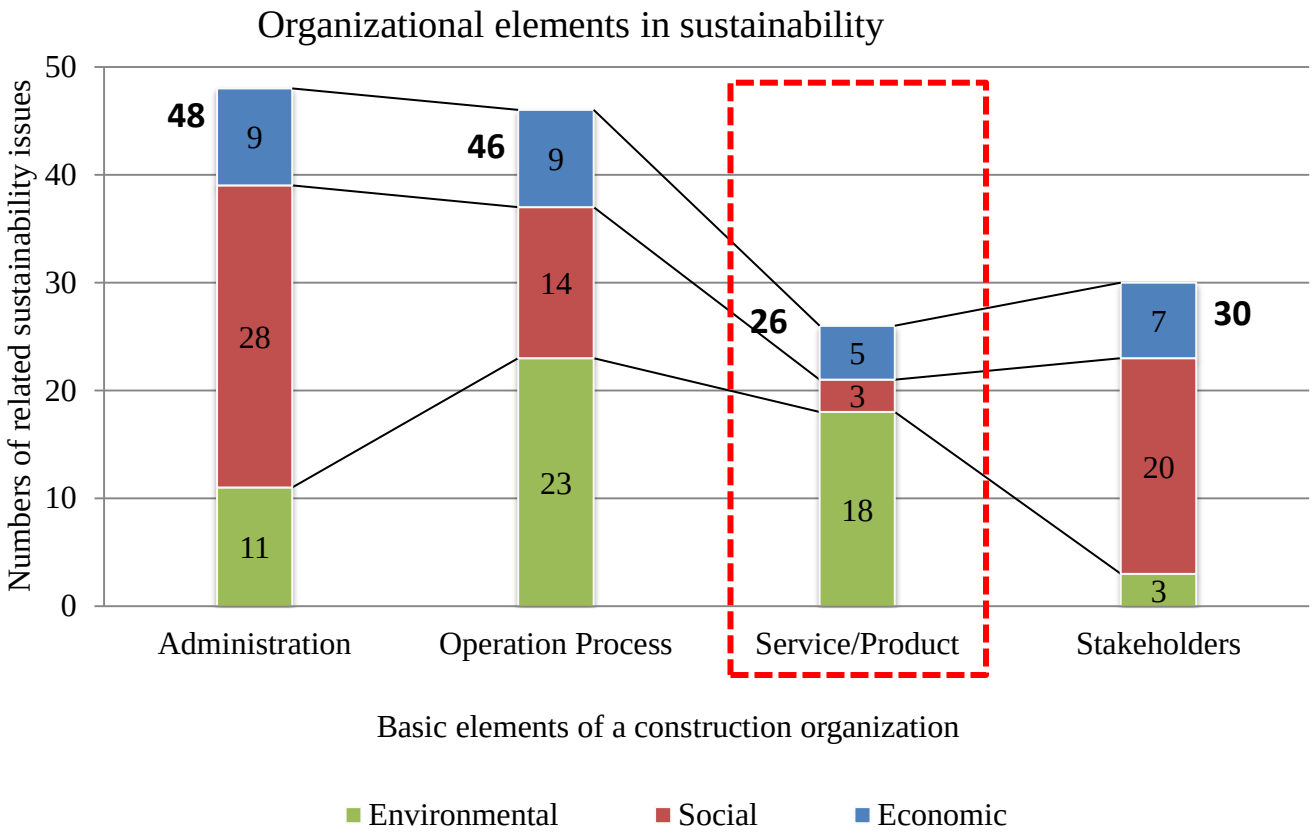
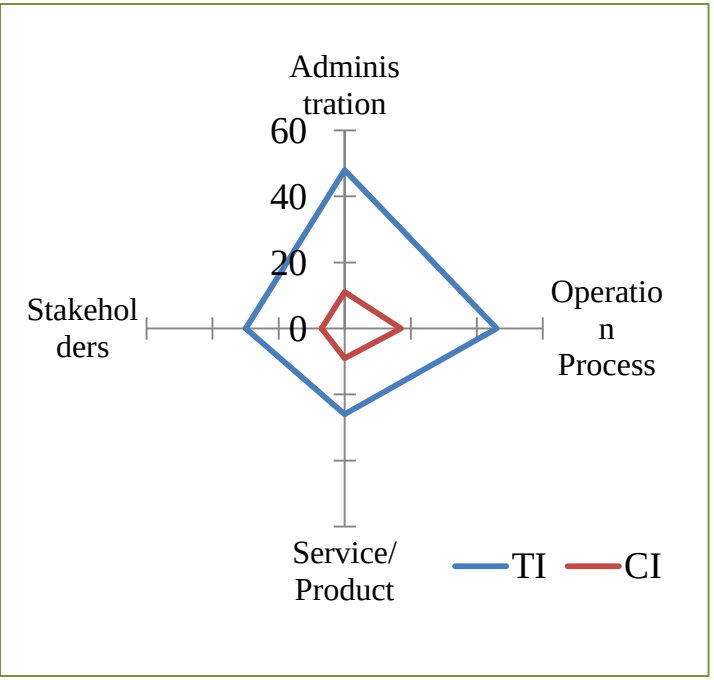


Figure 3 SRSCC corporate dimensions

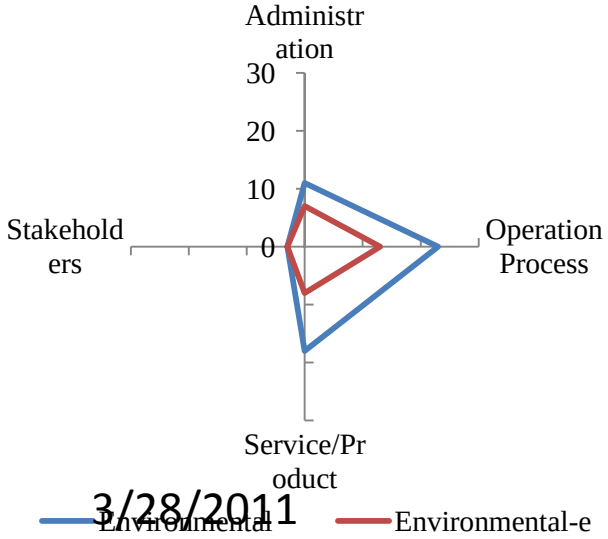
(3) The improvement of current SRSCC involves all corporate dimensions, especially in the concerns of administration and stakeholder management.

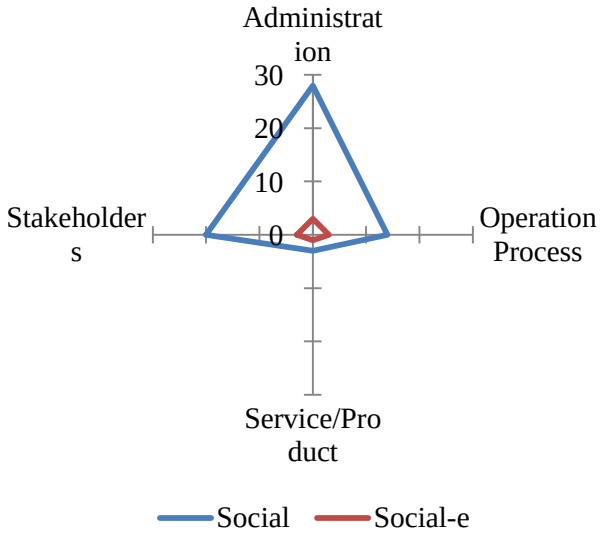


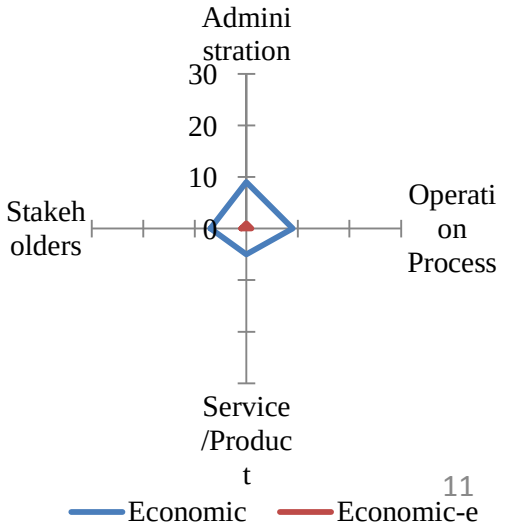
	Administration			Operation Process			Service/Product			Stakeholders		
	TI	CI	CP	TI	CI	CP	TI	CI	CP	TI	CI	CP
Environmental	11	7	63.6%	23	13	56.5%	18	8	44.4%	3	3	100.0%
Social	28	3	10.7%	14	3	21.4%	3	1	33.3%	20	3	15.0%
Economic	9	1	11.1%	9	1	11.1%	5	0	0.0%	7	1	14.3%
Total:	**48**	**11**	**22.9%**	**46**	**17**	**37.0%**	**26**	**9**	**34.6%**	**30**	**7**	**23.3%**

Table 5. The Relationship between Sustainability Dimensions and Construction Corporations (TI: Total Indicators, CI: Current Covered Indicators, CP: Covered Percentage)

Figure 4 SRSCC corporate dimensions (in detail)







(4) More methodologies beyond the material-based approaches are available to be employed.

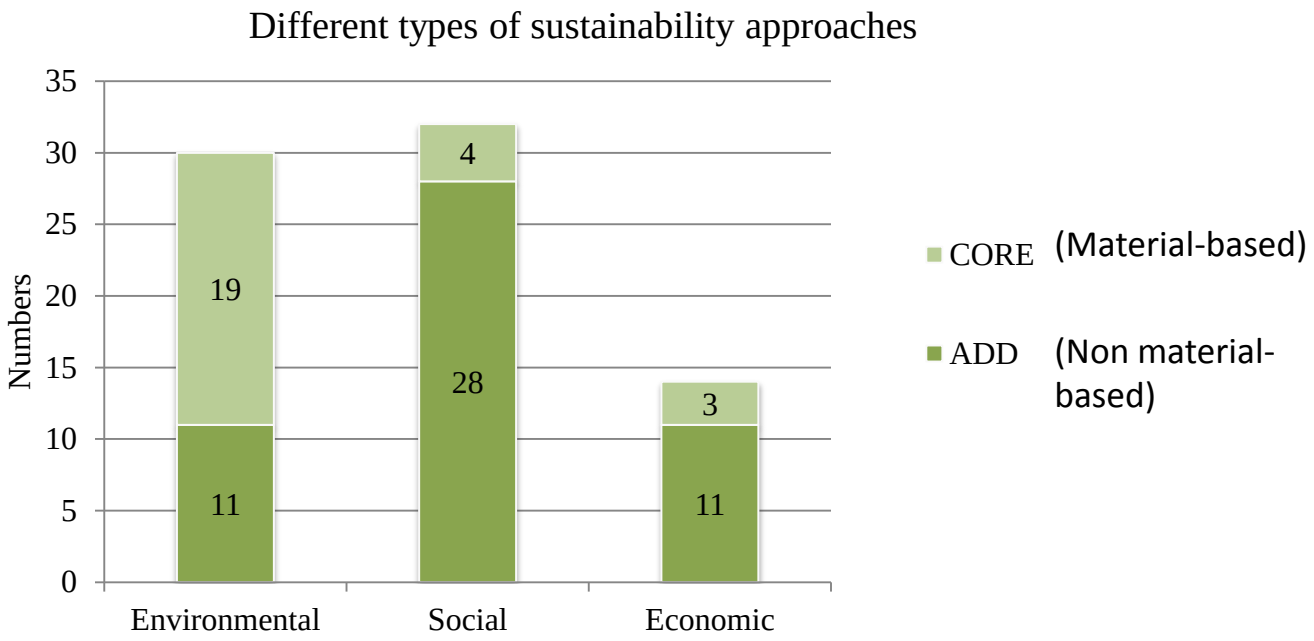


Figure 4 SRSCC used methods

	Environmental				Social				Economic				Subtotal				
	TI	TI%	CI	CI%	TI	TI%	CI	CI%	TI	TI%	CI	CI%	TI	TI%	CI	CI%	CP
CORE	19	63.3%	13	65.0%	4	12.5%	3	50.0%	3	21.4%	1	50.0%	26	34.2%	17	60.7%	**65.4%**
ADD	11	36.7%	7	35.0%	28	87.5%	3	50.0%	11	78.6%	1	50.0%	50	65.8%	11	39.3%	**22.0%**
Subtotal*	30	100.0%	20	100.0%	32	100.0%	6	100.0%	14	100.0%	2	100.0%	76	100.0%	28	100.0%	**36.8%**

(TI: Total Indicators, CI: Current Covered Indicators, CP: Covered Percentage, TI%: Total Indicator's percentage. CI%: Total Current Covered Indicator's percentage.)

4. Future works

No.	Name Of Green Companies (GC)	Public Market And Ticker	Reasons for Green
1	KBR, Inc.	[NYSE: KBR]	ENR TOP 100 Green contractors
2	Tutor Perini Corporation	[NYSE: TPC]	ENR TOP 100 Green contractors
3	Primoris Services Corporation	[NASDAQ (GM): PRIM]	ENR TOP 100 Green contractors
4	URS Corporation	[NYSE: URS]	ENR Top 100 green design firms with engineering and construction business
5	AECOM Technology Corporation	[NYSE: ACM]	ENR Top 100 green design firms with engineering and construction business
6	Tetra Tech, Inc.	[NASDAQ (GS): TTEK]	ENR Top 100 green design firms with engineering and construction business
7	Fluor Corporation	[NYSE: FLR]	Newsweek, Green 500 U.S. Companies in construction
8	Jacobs Engineering Group Inc.	[NYSE: JEC]	Newsweek, Green 500 U.S. Companies in construction
9	McDermott International, Inc.	[NYSE: MDR]	Newsweek, Green 500 U.S. Companies in construction
10	EMCOR Group, Inc.	[NYSE: EME]	Newsweek, Green 500 U.S. Companies in construction
11	The Shaw Group Inc.	[NYSE: SHAW]	Newsweek, Green 500 U.S. Companies in construction

V.S.

No.	Name Of Conditional Companies (CC)	Public Market And Ticker	Reasons of Selection
1	Granite Construction Incorporated	[NYSE: GVA]	ENR TOP 400 contractors
2	Pike Electric Corporation	[NYSE: PIKE]	ENR TOP 400 contractors
3	Hill International, Inc.	[NYSE: HIL]	ENR TOP 400 contractors
5	Layne Christensen Company	[NASDAQ (GS): LAYN]	ENR TOP 400 contractors
6	Matrix Service Company	[NASDAQ (GS): MTRX]	ENR TOP 400 contractors
7	Sterling Construction Company, Inc.	[NASDAQ (GS): STRL]	ENR TOP 400 contractors
8	Orion Marine Group, Inc.	[NYSE: ORN]	ENR TOP 400 contractors
9	Great Lakes Dredge & Dock Corporation	[NASDAQ (GS): GLDD]	ENR TOP 400 contractors
10	Willbros Group Inc.	(NYSE:WG)	ENR TOP 400 contractors
11	Quanta Services, Inc.	[NYSE: PWR]	ENR TOP 400 contractors

Comparison Metrics

- **DuPont Analysis**

$$\textit{Return of Equity } (ROE) = \frac{\text{Net } profit}{Equity} = \left(\frac{\text{Net } profit}{EBT}\right)^{①} * \left(\frac{EBT}{EBIT}\right)^{②} * \left(\frac{EBIT}{Revenue}\right)^{③} * \left(\frac{Revenue}{Assets}\right)^{④} * \left(\frac{Assets}{Equity}\right)^{⑤}$$

① for tax burden
② for interest burden
③ for operating margin
④ for asset turnover
⑤ for leverage ratio
⑥ for profit margin

$$\textit{Return of Equity } (ROE) = \frac{\text{Net profit}}{\text{Equity}} = \left(\frac{\text{Net } profit}{Revenue}\right)^{⑥} * \left(\frac{\text{Revenue}}{\text{Assets}}\right) * \left(\frac{\text{Assets}}{\text{Equity}}\right)$$

- **EVA, Economic Value Added**, is an estimate of a firm's economic profit - being the value created in excess of the required return of the company's shareholders. Calculated by the profit earned by the firm less the cost of financing the firm's capital.

EVA=	(EBIT*(1-tax rate))-wacc*captical
=	(RoC-wacc)*captical
=	NOPAT-wacc*invested capital

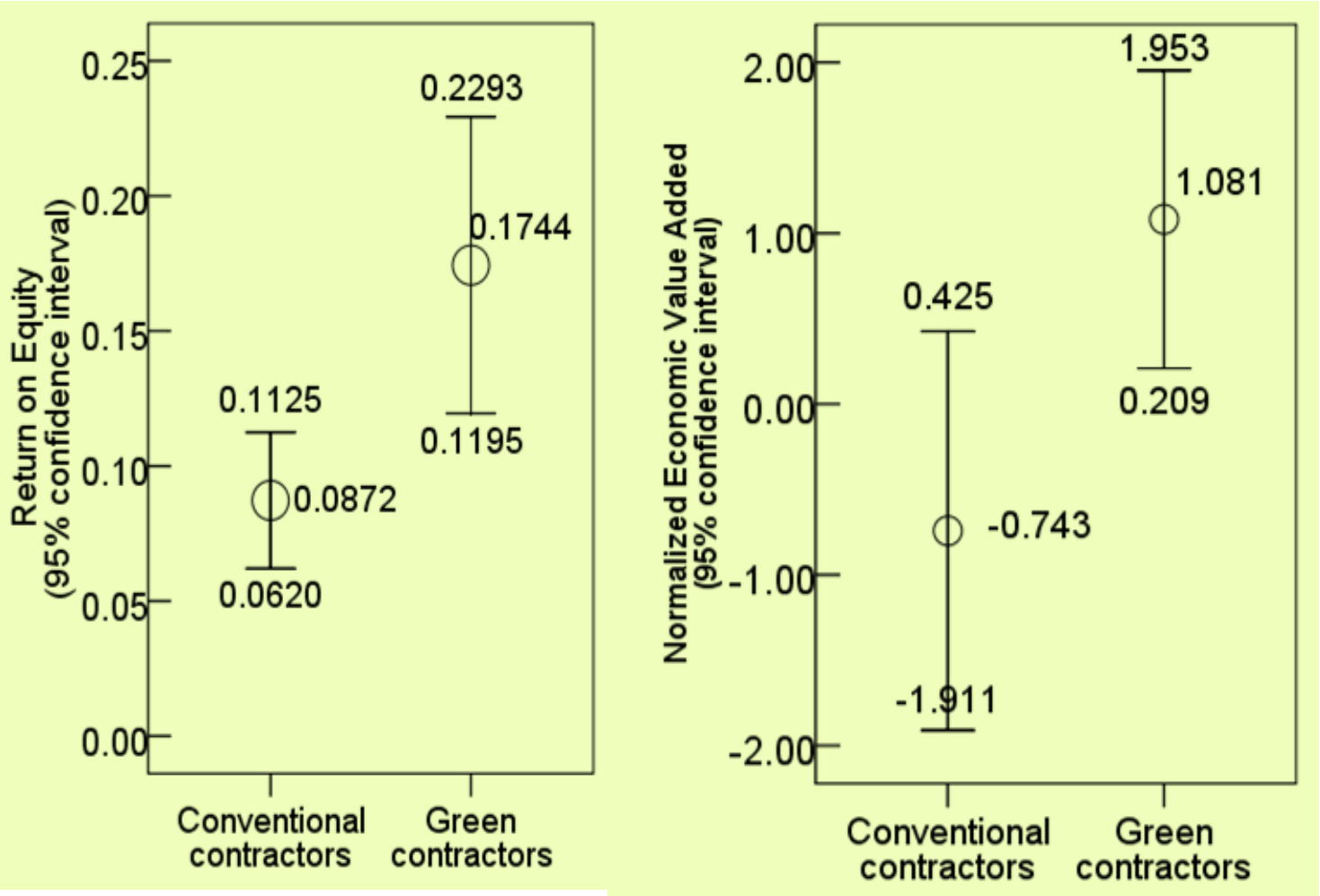


Figure 5 Error bars of Return on Equity (ROE) and normalized Economic Value Added (EVA)

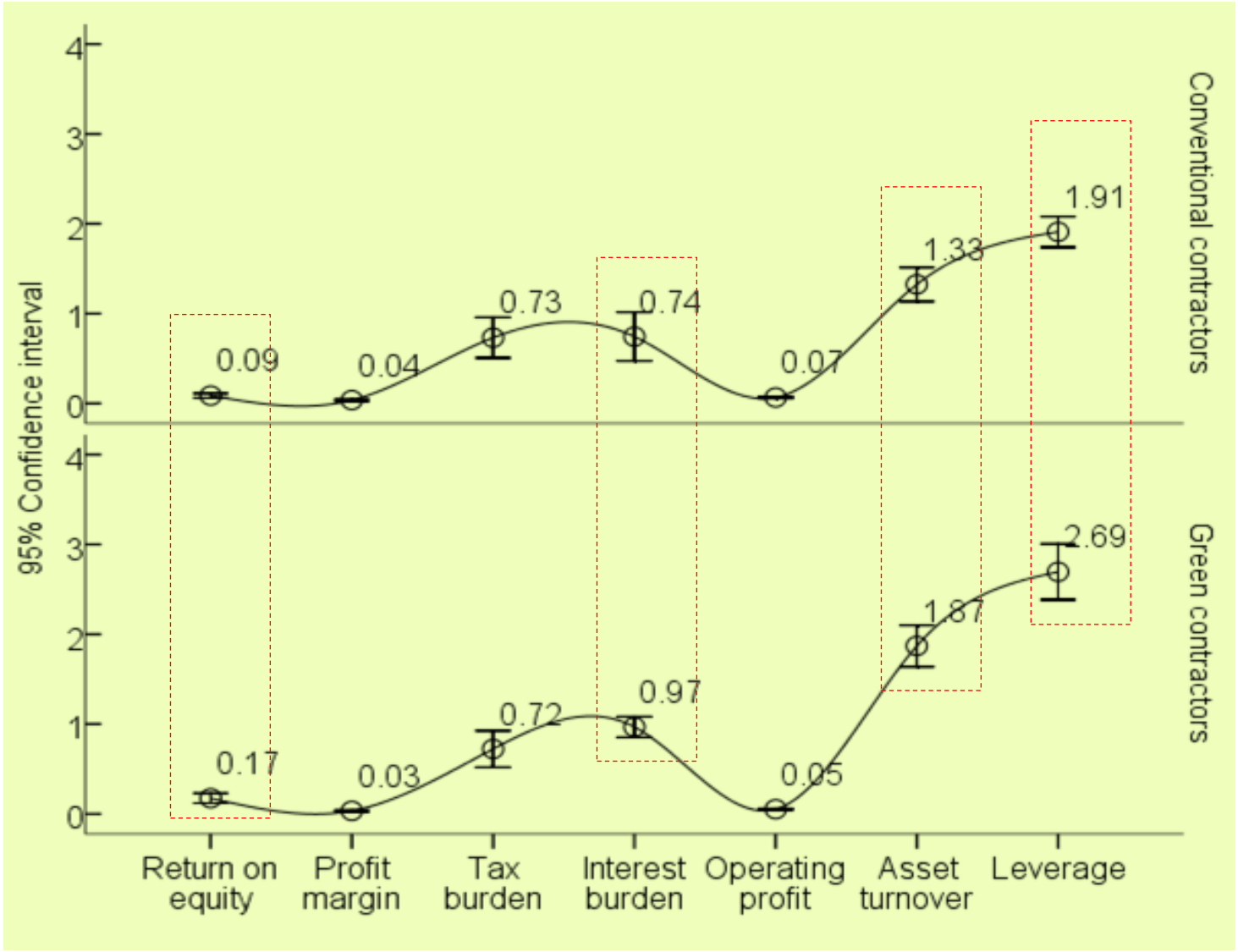


Figure 6 Error bar for DuPont analysis components

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Questions?

Thank you!

Please forward comments, ideas and suggestions to:

Yujie Lu, Research Assistant

Qingbin Cui, Ph.D., Assistant Professor

Department of Civil and Environmental Engineering, University of Maryland,
Email: cui@umd.edu

Tel: 301-405-8104