i3d3 RANKING	50	Bangladesh Electricity Upgrade and Expansion (BEUE) Project

CONSEQUENCES	Project Initiate	Project Implement	Project Influence	Score (%)
Financial (long life)	100	18	88	**69**
Social (loose fit)	50	-75	89	**21**
Ethical (least pain)	83	0	88	**57**
Environmental (low energy)	83	-10	88	**54**
Score (%)	**79**	**-17**	**88**	**50**

The Government of Bangladesh has identified electricity supply as a major constraint on GDP growth and overall economic development. To address these challenges, it has adopted a multipronged plan involving substantial sector investments, regional power trade and sector reforms. The Government has an ambitious target to achieve affordable electricity for all by 2021. To realize this target, new generation capacity must be complemented by upgrading transmission and distribution networks, as well as establishing connections for new consumers. The Government requested the Asian Infrastructure Investment Bank provide financial support for the BEUE project. This funding will: (i) expand electricity coverage by providing 2.5 million new service connections in rural areas and (ii) upgrade two grid substations (250 MVA to 480 MVA) and convert overhead distribution lines into 85 km of underground cables in northern Dhaka. BEUE will supplement other development partner efforts by providing additional financial resources to connect more rural and urban consumers, further reduce distribution losses, and improve the quality and reliability of power supply in Bangladesh. Upon completion it is expected to benefit about 12.5 million people in rural areas. Some delays to the underground cabling were experienced due to inclement weather.

i3d3 ranking

Success is measured on a scale of -100 to +100, where the border of success and fail is set at zero. The above table shows success according to project phases and consequences. Each value in this table is assigned equal weight. Light red shaded cells are problems. Success can be a surrogate for wider project 'quality'.

NET BENEFIT 67 Bangladesh Electricity Upgrade and Expansion (BEUE) Project

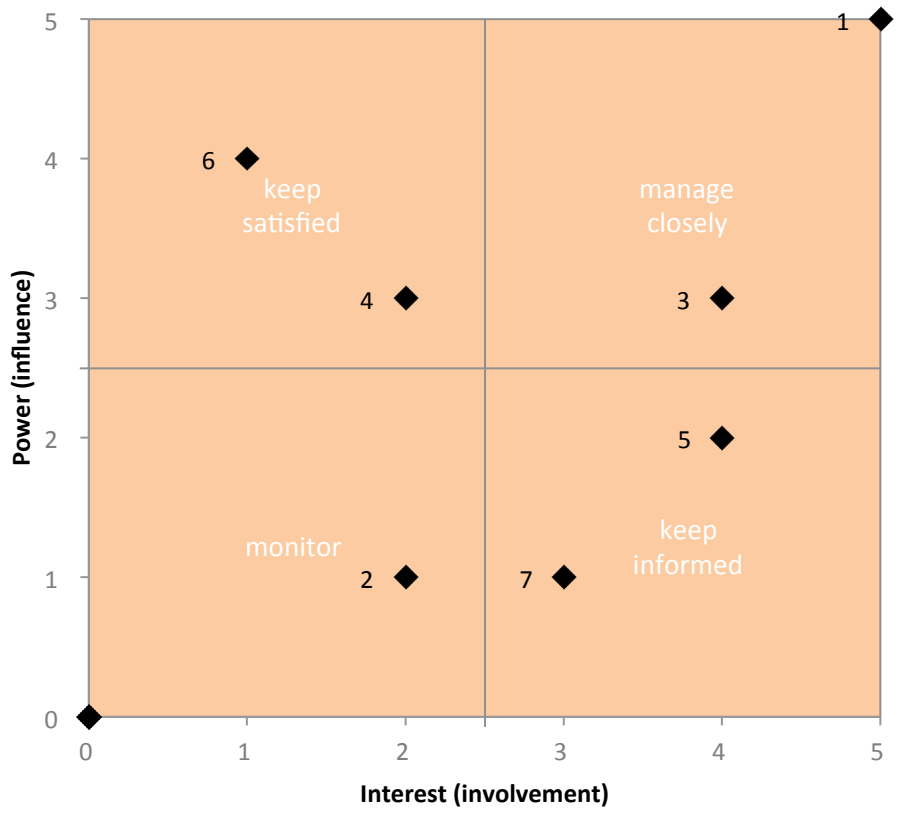
BENEFIT REALIZATION

winners 6 losers 1

Stakeholders:

	stakeholder ID#	power 1-5	interest 1-5	expected value (%)
Owner/sponsor	1	5.0	5.0	100
Local community	2	1.0	2.0	50
Shareholders/authorities	3	3.0	4.0	83
Environmentalists	4	3.0	2.0	83
Project team	5	2.0	4.0	-17
Client/end-user	6	4.0	1.0	88
Wider society	7	1.0	3.0	80
	8			
	9			
	10			
	11			
	12			

key: 1=minimal 2=low 3=moderate 4=high 5=extreme

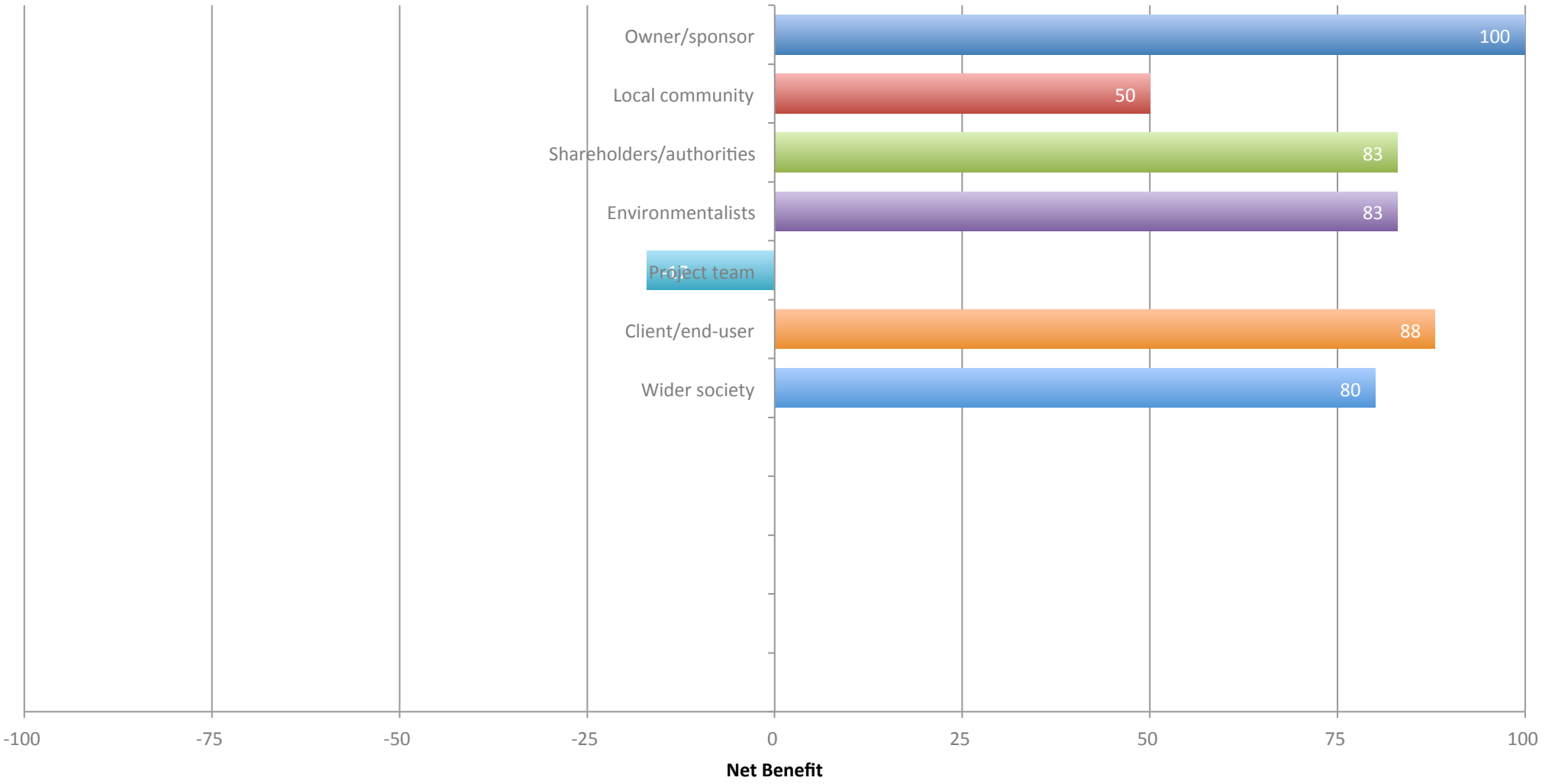


Benefit Register:

	benefit ID#	T/I	D/I	P/E	S/M/L	stakeholder ID#	expected value (%)	realized? Y/N	comments
BCR success score (design) > 0	1	T	D	P	M	1	100	Y	
LPS success score (design) > 0	2	I	I	P	S/M/L	2	50	Y	
RAR success score (design) > 0	3	T/I	D/I	P	M/L	3	83	Y	
EFP success score (design) > 0	4	I	I	E	L	4	83	Y	
PDS success score (deliver) > 0	5	T	D	P	S	5	-17	Y	Project delivery was considerably delayed
EUS success score (delight) > 0	6	T	D/I	P	S/M/L	6	88	Y	
SDG humanity index > 0	7	I	I	P/E	L	7	80	Y	
	8								
	9								
	10								
	11								
	12								

key: tangible / intangible; direct / indirect; planned / emergent; short term / medium term / long term

mean = 67%



HUMANITY INDEX	80	Bangladesh Electricity Upgrade and Expansion (BEUE) Project

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOAL (SDG) CONTRIBUTIONS	benefit justification

Financial: 20

investments in infrastructure are crucial to achieving sustainable development

enter primary SDG# here > 9

BEUE is intended to provide reliable electricity provision to 2.5 million households in rural Bangladesh for the first time.

Social: 0

economic growth must be inclusive to provide sustainable jobs and promote quality

not eligible 1

The intention is to help lift 12.5 million people out of poverty by providing electrical power, however, the delay in delivering this project has minimized the potential benefit.

Ethical: 20

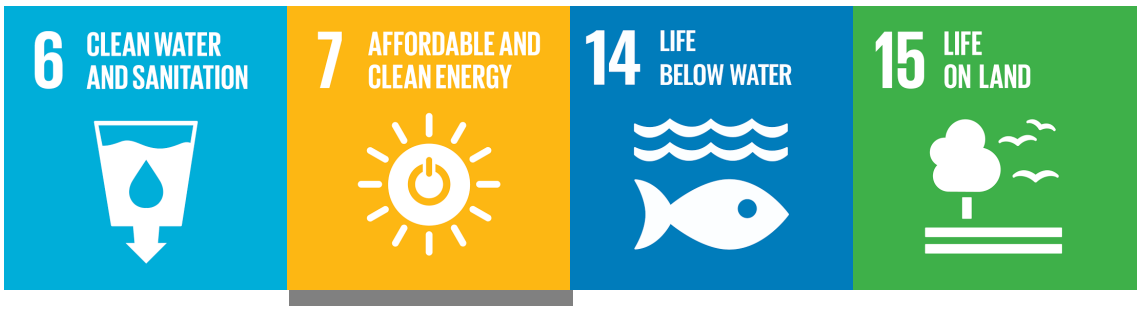
to reduce inequalities, policies should be universal in principle, paying attention to the needs of disadvantaged and marginalized populations

enter primary SDG# here > 10

Targeted existing households do not currently have access to electricity, and instead use fossil fuels for heating, cooking and other basic household needs.

Environmental: 40

energy is central to nearly every major challenge and opportunity



enter primary SDG# here > 7

While the provision of electrical power is not 100% clean, it is planned to build a new nuclear power plant to service the increased demand. Existing gas fired power plants are nevertheless cleaner than burning charcoal and wood.

revitalize the global partnership for sustainable development

BEUE was a partnership between the Bangladesh government and the Asian Infrastructure Investment Bank to provide basic infrastructure to rural areas of the country and, in the process, reduce pollution caused by the burning of fossil fuels.

enter SDG#17* here > 17

*this SDG is only available when the complexity score (delivery) is 12 or more

DESIGN (DSS) 79 Bangladesh Electricity Upgrade and Expansion (BEUE) Project

SUCCESS FACTOR

feasible 100 | useable 50 | achievable 83 | sustainable 83

Profit:

Benefit-cost ratio (BCR) **2.0502**

year	benefit	discounted benefit	cost	discounted cost
0		-	23	23
1		-	6,272	6,149
2		-	7,997	7,686
3		-	6,272	5,910
4	5,335	4,929	267	246
5	5,335	4,832	267	242
6	5,335	4,737	267	237
7	5,335	4,644	267	232
8	5,335	4,553	267	228
9	5,335	4,464	267	223
10	5,335	4,377	267	219
11	5,335	4,291	267	215
12	5,335	4,207	267	210
13	5,335	4,124	267	206
14		-		-
15		-		-
16		-		-
17		-		-
18		-		-
19		-		-
20		-		-
21		-		-
22		-		-
23		-		-
24		-		-
25		-		-
26		-		-
27		-		-
28		-		-
29		-		-
30		-		-
		45,158		22,026

discount 2.00 %
currency BDT (million)

assume BCR (override)

Notes
Benefits and costs should exclude intangible cash flows
Discount rate is net of inflation (i.e. real discount rate)
Cash flows are expressed in Year 0 terms
BCR can be entered directly using 'assume BCR' cell
Original feasibility study not avaiable
Income = 2.5m households x 400KWh/year x BDT 5.335/KWh
Maintenance and repair costs assumed at 5% of income
Marginal cost of energy generation is excluded
Usage cost based on residential consumer
Average household size = 5 people
BCR = 2 threshold reached after 10 years of operation
New Russian-built Rooppur nuclear power plant online by 2024

People:

Statement: *I support this proposed project*

Local project support (LPS) **1.0000**

strongly disagree	disagree	no opinion	agree	strongly agree	responses	sample return rate	N/A 0%
2	8	-	72	22	104		

Politics:

Risk and reward (RAR) **1.8286**

ID	reward (opportunities) - * must complete 5	probability 1-3	consequence 1-3	risk level 1-9
A*	Affordable electricity for all by 2021	1	3	3
B*	Replace more polluting current energy sources	3	3	9
C*	Improve essential infrastructure and grow GDP	3	2	6
D*	Increase the number of rural and urban consumers	3	1	3
E*	Make existing distribution networks more resilient	2	2	4
F	Reduce poverty	1	3	3
G	Minimize electricity distribution losses	2	2	4
			mean	4.57

ID	risk (threats) - * must complete 5	probability 1-3	consequence 1-3	risk level 1-9
A*	Undertake Environmental and Social Review (ESR)	3	1	3
B*	Undertake Initial Environmental Examination (IEE)	3	1	3
C*	Unable to obtain sufficient finance for construction	1	3	3
D*	Affordable consumer pricing	1	3	3
E*	Increased risks of blackouts due to greater demand	1	1	1
F	Disruption during construction	1	2	2
G				
			mean	2.50

Planet:

Ecological footprint (EFP) **22.0000**

environmental categories (impacts)	extreme (0 stars)	high (1 star)	moderate (2 stars)	low (3 stars)	minimal (4 stars)	regenerative (5 stars)
non-renewable energy demand (embodied carbon)			Y			
water quality impacts					Y	
air pollution					Y	
natural resource depletion					Y	
biodiversity loss					Y	
non-degradable or non-recyclable waste to landfill					Y	
	0	0	1	0	5	0

DELIVER (PDS) -17 Bangladesh Electricity Upgrade and Expansion (BEUE) Project

SUCCESS FACTOR within budget 18 | on schedule -75 | as specified 0 | no surprises -10

Cost:

	planned	actual		change
Construction (BDT million)	20,563.54	19,669.78	✔	-4.35%

Time:

Onsite activity (calendar month)	36.00	54.00		50.00%

Scope:

New service connections (million)	2.50	2.50	✔	0.00%

Risk:

√ mean risk level (1-3)	2.00	2.07		3.51%

Planned risk events

Probability and consequence are assessed after any mitigation strategies have been included in scope, cost and time estimates

ID	risk event - * must complete 5	planned probability 1-3	planned consequence 1-3	planned risk level 1-9
A*	Delays due to cyclone flooding (May-November)	3	3	9
B*	Seismic activity causing damage to completed work	1	3	3
C*	Price increase for equipment resulting in project cost overruns	2	2	4
D*	Inadequate measures to mitigate local transportation disruption	2	2	4
E*	Procurement failure and/or improper tendering procedures	1	2	2
F	Inadequate record-keeping leading to potential corruption	1	3	3
G	Misuse of loan proceeds	1	3	3
H				
I				
J				
K				
L				
M				
N				
O				
P				
Q				
R				
S				
T				
			√ mean	2.00

Actual risk events

Consequence is determined based on final project outcomes, and should include any unanticipated risk events

ID	risk event - * must complete 5	actual probability 1-3	actual consequence 1-3	actual risk level 1-9
A*	Delays due to cyclone flooding (May-November)	3	3	9
B*	Seismic activity causing damage to completed work	3	1	3
C*	Price increase for equipment resulting in project cost overruns	3	2	6
D*	Inadequate measures to mitigate local transportation disruption	3	1	3
E*	Procurement failure and/or improper tendering procedures	3	1	3
F	Inadequate record-keeping leading to potential corruption	3	1	3
G	Misuse of loan proceeds	3	1	3
H		-		
I		-		
J		-		
K		-		
L		-		
M		-		
N		-		
O		-		
P		-		
Q		-		
R		-		
S		-		
T		-		
			√ mean	2.07

KPIs

-100 ≤ PDS ≤ 100

		change
value (scope/cost)	✔	4.54%
efficiency (cost/time)		-36.23%
speed (scope/time)		-33.33%
innovation (risk/cost)	✔	8.21%
complication (time/risk)	✔	44.91%
impact (scope/risk)		-3.39%
profit (scope²/cost²)	✔	9.29%
people (scope²/time²)		-55.56%
planet (scope²/risk²)		-6.67%
progress (TBL mean)		-17.64%

12 high

COMPLEXITY	1-3
X: scale	2
Y: uncertainty	2
Z: stakeholders	3

DELIGHT (EUS) 88 Bangladesh Electricity Upgrade and Expansion (BEUE) Project

SUCCESS FACTOR	desirable	adaptable	practicable	serviceable
	88	89	88	88

Attractiveness:

	mean	influence
Nice to look at?	3.75	
High quality?	5.46	
Profitable?	3.51	
Well-designed?	4.55	
Valuable?	3.67	
Prestigious?	4.60	
Durable?	5.15	
Popular?	4.61	
Joyful?	4.02	
Unique?	3.48	
User-defined …		
User-defined …		
	4.28	24.74%

Flexibility:

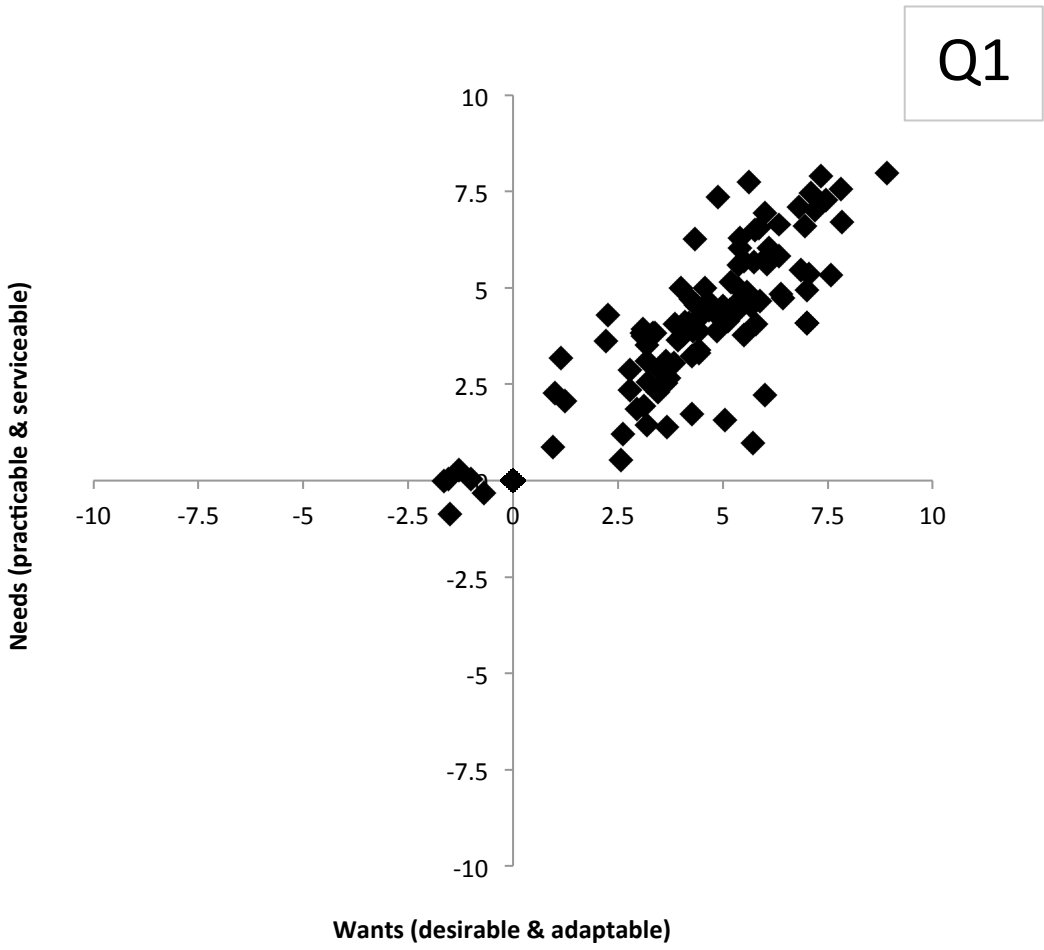
	mean
Versatile?	5.45
Easily modified?	4.96
Able to be customized?	5.11
Multi-use?	2.11
Transportable?	4.68
Better with age?	5.14
Modular?	4.18
Scalable?	4.35
Technically clever?	5.49
Timeless?	4.35
User-defined …	
User-defined …	
	4.58 26.50%

Fit for Purpose:

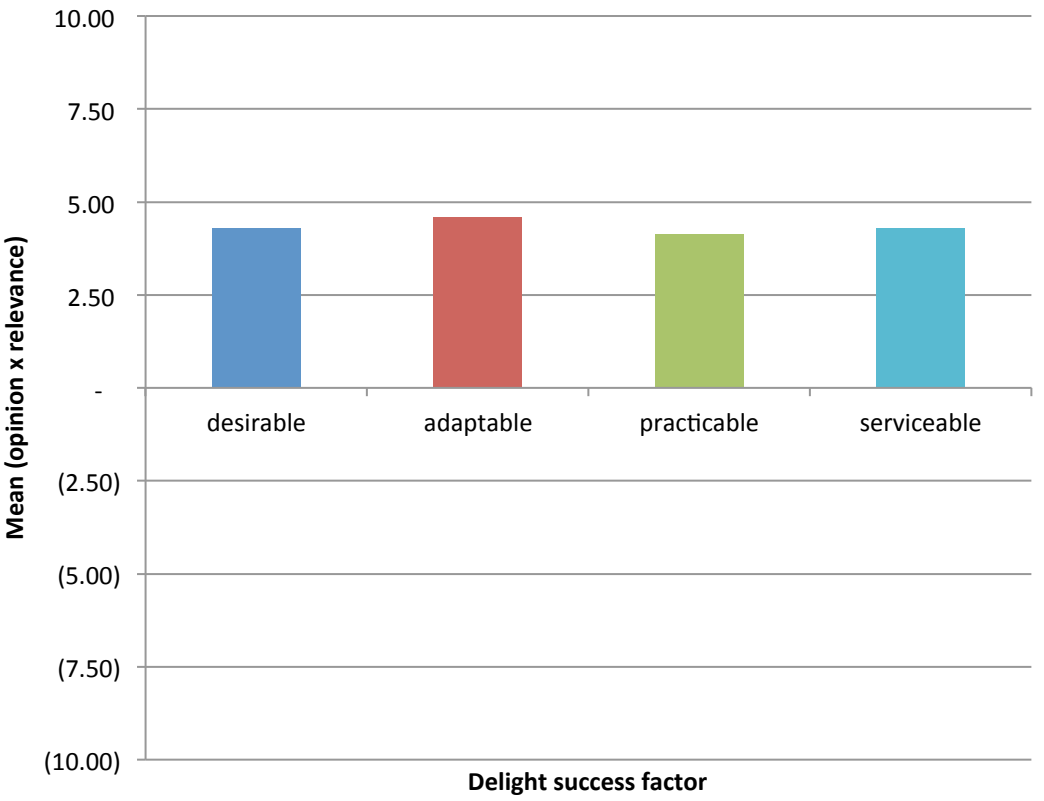
	mean
Functional?	4.29
Appropriate?	4.21
Robust?	3.67
Safe?	6.50
Healthy?	5.09
Problem-solving?	4.00
Easy to use?	4.90
Affordable?	1.95
Comfortable?	3.58
Ethical?	3.12
User-defined …	
User-defined …	
	4.13 23.89%

Enduring:

	mean
Low maintenance?	0.44
Easily cleaned?	4.13
Recyclable?	4.43
Non-toxic?	5.32
Repairable?	5.39
Energy efficient?	4.77
Reliable?	3.99
Accessible?	5.25
Regenerative?	3.38
Habitat-safe?	5.94
User-defined …	
User-defined …	
	4.30 24.88%
	100.00%



percent Q1	94.23	%
total responses	104	



sample		N/A
return rate		0%
expected delight (LPS)		50%
actual delight (EUS)	✔	88%

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Instructions

Enter survey responses to the right of this page. Responses are computed as opinion multiplied by relevance, and are in the range -10 to +10. There is provision for 1,000 responses to be entered against each question. Specify the total responses in Cell K38.

Further Information

https://bond.edu.au/cccr
(including latest updates)

Disclaimer

Every attempt has been made to use unbiased evidence-based data (cells with light grey shading) in this study where possible.