This illustration shows how worksheet Illustration1.xlsx is adapted to accommodate a large funding situation with J=12 Category 2 features and 2^{12} = 4,096 possible funding scenarios.

Figure 2.1
Partial image of the evaluation sheet of illustration2.xlsx.

	F	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	BY	BZ	CA
10				Decatenated 0/1 characters of v and the 0/1 values of f2,j, j=1,…,12														
11	Scenario reference, v	Binary form of v		1	2	3	4	5	6	7	8	9	10	11	12	Funded Category 2 features, j	r	Funding cost[1]
2556	2544	00001001	11110000	0	0	0	0	1	1	1	1	1	0	0	1	5 6 7 8 9 12	6	14.209
2557	2545	00001001	11110001	1	0	0	0	1	1	1	1	1	0	0	1	1 5 6 7 8 9 12	7	14.489
2558	2546	00001001	11110010	0	1	0	0	1	1	1	1	1	0	0	1	2 5 6 7 8 9 12	7	14.561
2559	2547	00001001	11110011	1	1	0	0	1	1	1	1	1	0	0	1	1 2 5 6 7 8 9 12	8	14.841
2560	2548	00001001	11110100	0	0	1	0	1	1	1	1	1	0	0	1	3 5 6 7 8 9 12	7	14.584
2561	2549	00001001	11110101	1	0	1	0	1	1	1	1	1	0	0	1	1 3 5 6 7 8 9 12	8	14.864
2562	2550	00001001	11110110	0	1	1	0	1	1	1	1	1	0	0	1	2 3 5 6 7 8 9 12	8	14.936
2563	2551	00001001	11110111	1	1	1	0	1	1	1	1	1	0	0	1	1 2 3 5 6 7 8 9 12	9	15.216

[1] $M.

For the funding situation of Table 1 of the manuscript with I=11 and j=1,…,12, the Evaluation tab of Illustration1.xlsx was adapted in the following ways. The Fill feature of Excel© was used to enter respectively the values of v (=0,1,…,4095) in cells F12, F13, …,F4107. The cell formulae of K43-AP43 were then copied to cells K44-AP4107 producing the Evaluation sheet of Illustration2.xlsx. The copying converted the v of cells F12-F4107 to binary forms appearing in G12-J4107 with cell entries I12-J4107 relevant to the J=12 of this illustration, see above Figure 2.1. The outcomes of the conversions are the 0/1 values indicating exclusion/inclusion of Category 2 feature j(=1,…,12) in funding scenarios v=0,1,…,31 according to the labels j=1-12 appearing in cells K11-V11. Aspects of each scenario v are calculated in cells BY12-CA4107 including the funding cost of scenario v in column CA. Figure 2.1 above is a partial image of the Evaluation sheet of Illustration2.xlsx where rows 2556-2563 display the outcomes of stepwise additions of features j=1, 2, 3 to the indices 5 6 7 8 9 12 of scenario v=2544 in row 2556. The cell contents of BX12-CA4107 of the Evaluation sheet appear in the Results sheet in cells A12-D4107. The same contents appeared in cells F12-I4107 of the same sheet, were changed to values, then sorted by r in ascending order and scenario cost in ascending order within sorted r. The least costly funding scenarios for r=0,1,…12 Category 2 features are summarized in Table 2.1 below.

Table 2.1
The least cost scenarios of illustration 2.

r	0	1	2	3	4	5	6	7
Least Cost ($M) of r Funded Category 2 Features	11.069	11.349 j=1	11.701 j=1,2	12.076 j=1-3	12.474 j=1-4	12.881 j=1-5	13.356 j=1-16	13.844 j=1-7
r	8	9	10	11	12			
Least Cost ($M) of r Funded Category 2 Features	14.364 j=1-8	14.900 j=1-9	15.519 j=1-10	16.201 j=1-11	16.915 j=1-12			

If $12M are available for funding Category 1 and Category 2 features, as many as r=2 Category 2 features may be funded; for $13M, at most r=5; for $14M, r=7; for $15M, r=9; and for $16M, r=10. The

funding of all r=12 Category 2 features requires $16.915M. For the situation with a funding cap of $13M, the five Category 2 features j=1-5 constitute the least costly scenario at $12.881M. Suppose during review a new consideration in addition to the funding cap of $13M is identified. There are eight scenarios with r=5 and funding costs between $12.881M and $13M, see cells G806-I813 in the Results sheet of Illustration2.xlsx. Among them, features j=1-5 appear in various combinations, albeit in only eight ways. If the new funding consideration is satisfied by at least one of the eight, a feasible scenario is identified. Otherwise, either fewer than five features can be funded or the new consideration cannot be accommodated within the $13M funding cap. The outcomes presented in the Results sheet are helpful in examining funding considerations of this kind.

For a large spreadsheet such as Illustration2.xlsx, a Calculator is given to facilitate investigation of the consequence (e.g., cost and other considerations) of funding particular /discrete Category 2 features of interest. See cells J1-K7 of the Evaluation sheet of Illustration2.xlsx for the Calculator. Given the Category 2 features composing a scenario of interest, the Calculator identifies v and makes it unnecessary to search a long spreadsheet for the details thereof. To use the Calculator, enter indices j for the funded features of interest in cell K4 with separating commas, e.g., 2,5,12. The corresponding values of v and the scenario cost are returned respectively in cells K5 and K6. With v, additional details of the scenario can be found in the row of the Evaluation sheet in which v appears. For example, suppose the scenario with funded features j=9,12 are of interest to the analyst. With the entry 9,12 in cell K4, v=2304 and the cost $12.319M are returned in cells K5 and K6 respectively. Because the Category 2 feature costs for this illustration are in ascending order with respect to j=1,2,…,12, the least costly single funding feature to add to the j=9,12 of scenario v=2304 is feature j=1. The entry 1,9,12 in cell K4 returns v=2305 and the funding cost $12.599M in cells K5 and K6 respectively. The least costly pair addition to scenario with j=9,12 is j=1,2. Entry of 1,2,9,12 in cell K4 returns v= 2307 and the funding cost $12.951M. If the funding cap is less than $12.951M, there is no feasible funding addition to the scenario with j=1,9,12. If other funding criteria applied and cell formulae were created for their evaluation by the user and included among the cell formulae for each v, their status would appear in the row corresponding to the returned v of cell K4. Illustration 3 that follows addresses such a situation. Note that alternative funding scenarios with j=9,12 appear in the vicinity of v=2304.