Net Benefit Calculation Algorithm V6

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Objective

The Net Benefit Reward (NBR) algorithm calculates how much Net Benefit Award (NBA) Producers get when people consume their products and services. At the heart of the algorithm is the NBR formula. Version 6 of this formula, described below, will be used during various demonstration projects, the first one being in the Kenton Neighborhood in Portland, Oregon, the second in Chico, California.

Goals

This proposal updates the NBA algorithm proposed in "Net Benefit Calculation Algorithm Proposal" to version 6.

Solution/discussion

Formula version 6:

$$NB_A = C_{PDB}\left[\frac{A}{A_{MAX}} + \frac{D}{A'}\right] + \left[C_{CB}\left(\frac{P_s}{M_1} \cdot \frac{P_o}{M_2}\right) + C_{EB}\left(\frac{S}{M_3} + \frac{S_e}{M_4} + \frac{S_h}{M_5}\right)\right]$$

Modifications:

- Eliminates the E (effort) variable
- Changes operators in the C_{PDB} expression from subtraction to addition
- Changes the operator between C_{PDB} and the rest of the formula from multiplication to addition
- Changes the operator in C_{CB} from addition to multiplication
- Changed the positions of the two remaining variables in C_{PDB}.

All variables are defined below. Ranges were also improved based on previous tests. Bolded cells indicate substantial changes from version 5.

Detailed discussion

Variable	Name	Measures	Scale
A	Resource abundance	**How abundant are resources used to make the product or service?**	Max Abundance: 255 Max Scarcity: 1 Gradation: 1
A'	Producer population	How many people produce this?	Max: 255 Min: 1 Gradation: 1
D	Consumer demand	How many people want this?	Max Demand: 255 Min Demand: 1 Gradation: 1
P_s/P(S)	Consumer subjective satisfaction	**Subjective satisfaction that consumers experience—real-time input.**	Max Pos: 2 Max Neg: -2 Gradation: 2
P_o/P(O)	Consumer objective benefit	**Objective benefit that consumers get. Detail follows.**	Max Pos: 255 Max Neg: -255 Scale = "increases well being" or "decreases well being" Gradation: 1
S	Social benefit	**What is the impact scale across society?**	Family = 1 Nano = 2 Micro = 4 Kenton = 6
S_e/S(E)	Environmental effect	What are this thing's effects on the environment/biosphere? **Detail follows.**	Destructive Max: -255 Constructive Max: 255 Gradation: 1
S_h/S(H)	Human effect	What are this thing's effects on the human population overall? **Detail follows.**	Less Resilient/Viable: -255 More Resilient/Viable: 255 Gradation: 1

Formula implementation principles:

$$NB_A = C_{PDB}\left[\frac{A}{A_{MAX}} + \frac{D}{A'}\right] + \left[C_{CB}\left(\frac{P_s}{M_1} \cdot \frac{P_o}{M_2}\right) + C_{EB}\left(\frac{S}{M_3} + \frac{S_e}{M_4} + \frac{S_h}{M_5}\right)\right]$$

Formula description:

$$NB_A = f(\text{Production Demand Balance}) + (\text{Consumer Benefit} + \text{Environmental Benefit})$$

In narrative:

"Net Benefit Award is a function of the **Production Demand Balance (PDB),** plus the sum of the **Consumer Benefit (CB)** and **Environmental Benefit (EB)** components.

Relationship of variables to Net Benefit Award

Production Demand Balance (PDB)

$$C_{PDB}\left[\frac{A}{A_{MAX}} + \frac{D}{A'}\right]$$

Production Demand Balance accounts for and relates productive activity of producers, consumer demand, and resource abundance. It contains several variables, each having different relationships with the overall expression:

A↓ => PDB↓ <=> A↑ => PDB↑
A'↑ => PDB↓

$$D\uparrow \Rightarrow PDB\uparrow \iff D\downarrow \Rightarrow PDB\downarrow$$

Resource Abundance *(the amount of resources used to make a product or service and how scarce or abundant those resources are) has a* ***direct relationship*** *with PDB: All other variables being equal to one, as resources (A) become scarce, we want the resulting Production Demand Balance calculation to go down, thereby reducing the NBR. As the number of producers (A') increases, we want the Production Demand Balance to go down, thereby reducing the NBR. As demand for a product increases (D), we want the Production Demand Balance to increase, thereby increasing the amount of NBR awarded.*

C(PDB), and A(MAX) are fine-tuning inputs. Fine tuning features are discussed later.

Consumer Benefit (CB)

Consumer Benefit *accounts for subjective satisfaction consumers experience in consuming a good (Ps). Ps is multiplied by Po, which represents the objective benefits an individual consumer experiences when consuming a good.*

$$C_{CB}\left(\frac{P_s}{M_1}\cdot\frac{P_o}{M_2}\right)$$

Consumer benefit has a ***direct relationship*** *with Net Benefit Award as well:*

$$CB\uparrow \Rightarrow NBA\uparrow$$

All other variables being equal, as Consumer Benefit increases, the amount of NBA should increase.

Environmental Benefit (EB) expression:

EB accounts for global effects on humanity and the biosphere measured by several variables: Societal Benefits (S), Environmental benefits (S(E)), and the human benefits (S(H)).

$$C_{EB}\left(\frac{S}{M_3}+\frac{S_e}{M_4}+\frac{S_h}{M_5}\right)$$

Societal effects *are measured on a scale representing how broadly something affects humanity (neighborhood, community, city, region, nation, etc.).* ***Environmental effects*** *are measured on a scale representing how beneficial or destructive to the environment a product or service is.* ***Human effects*** *are measured on a scale representing how something makes humanity more or less resilient/viable. Each variable, as well as the whole EB expression, has its own fine-tuning variable*

Environmental Benefit has a direct relationship to Net Benefit Award:

$$EB\uparrow \Rightarrow NBA\uparrow$$

When a person's action increases environmental well-being, Net Benefit Award should increase. If that action damages environmental well-being, Net Benefit Award should decrease.

Fine-Tuning elements

Constants represented by ©, M (1-5), and A(Max) allow fine tuning. Fine tuning is important when using the formula across wide variety of products and services. For example, given the Consumer Benefit expression:

$$\frac{P_s}{M_1} \cdot \frac{P_o}{M_2}$$

Where P(S) is subjective consumer satisfaction and P(O) is objective satisfaction, M(1) and M(2) allow these two variables to be fine-tuned when calculations are performed on different products and services. When a person chooses to eat fresh vegetables over the course of a year, the objective benefits P(O) of that diet far outweigh (perhaps initially) the subjective benefit P(S). For a meat eater going vegetarian for health reasons, for example, P(S) would likely be negative! M(2) allows us to fine tune P(O) up for consuming vegetables, balancing subjective dislike for something that is objectively highly beneficial.

Coefficients C(CDB), C(CB) and C(EB) allow the formula to be fine-tuned at the major component level. For example, building an orbital community in space, or a deep-space faring craft, may not be much in demand initially. It may require a large number of producers and draw on a lot of resources. Yet, such an initiative could have huge benefits for the Environment, Humanity, and Society. C(EB) allows the formula to be tuned-up or

weighted in favor of that benefit. There will likely be other uses for the fine-tuning elements that we cannot anticipate.

How variable values are determined

Resource Abundance variable (A) — Values are determined by counting the number of resources used in creating a product or service. Most products and services are made from more than one resource. Once the resources are known, the relative abundance or scarcity of each resource is determined and indexed along the variable's range.

Let's look at a community demonstration project. For tomatoes, we might want to know the resources used to produce them. Given that the demonstration project is small and volunteer capacity limited, we could simplify the determination process. Instead of accounting for all factors (water, fertilizer, seeds, etc), we may just want to know how many raised garden beds there are (resources). We then might want to know if all the garden beds are being used for other products (scarcity) or how many of those are currently used for tomato production. This information is then indexed to the variable's range, providing a calculable value.

Producer Population (A') — This value is determined by counting the people producing the product in question. "How many people are offering tomatoes to others?"

Consumer Demand (D) — This is the number of people wanting to consume the product or service. It can be determined in a variety of ways. As a default in demonstration projects, the value could equal the total number of people participating in the project. As the project matures, the value could be the number of people who consumed the project in a given period. NBR is awarded after the fact on a periodic basis, and this information would be known at the end of a given period.

Consumer Subjective Satisfaction (PS/P_S) — Consumer satisfaction is real-time input. The value is determined using a scale corresponding to a set of emoticons similar to those used to gauge pain in a clinical environment. A consumer rates a product or service experience by clicking on an emoticon, the algorithm pulls the value from the database that corresponds to that emoticon, and that value is then fed into the formula.

Consumer Objective Benefit (PO/P_O) — Objective benefits are determined regularly for each product and service. In the post-transition implementation, this process includes citizen juries similar to Grand Juries in today's criminal justice system. These juries comprise randomly selected citizens serving on the jury for a given period. The juries are presented with objective, science-based presentations made by experts in industry or related industries. After a series of expert testimonies, these jury members deliberate over what they have heard and assign a constant to be used for that product or service. The constant is then used for a specified regular period, after which the constant is reviewed in light of all new information. The juries rule on values for products and services whose objective value may be controversial, subject to interpretation, or questionable with regard to moral or ideological convictions. Values for products and services that do not entail such concerns may be periodically determined by a group of experts who volunteer for this purpose.

The values derived from either process are fixed for a given period and used as needed in the formula/algorithm.

For demonstration projects limited by resources and volunteer time, these values will likely be estimated by the provisional payer organization—members of the core team at Copiosis Headquarters in Portland, Oregon, or local volunteers serving as surrogates of the payer organization.

Social Benefit (S) — Values for this variable are indexed to the societal scale a product or service benefits. In Kenton, a product's S value is derived by determining whether it benefits a family, phase I, phase II, or phase III of the project. Values are fixed to each level so when the level is determined, the value is pulled from the database and fed into the formula.

Environmental Effect (SE/S_E) — Like the PO, Environmental benefits are determined periodically per product or service through a series of citizen juries and are fixed for a given period and used as needed in the formula/algorithm. Values are weighed against "Does this product or service constructive or destructive to the environment? For demonstration projects limited by resources and volunteer time, these values will likely be estimated by the provisional payer organization—members of the core team at Copiosis Headquarters in Portland, Oregon, or local volunteers serving as surrogates of the payer organization.

Human Effect (SH/S_H) — Like the SE, the effects on people are determined periodically for each product and service through citizen juries and are fixed for a given period and used as needed in the formula/algorithm. Values are weighed against, "Does this product or service contribute to humanity's resilience and viability? How much?" For demonstration projects limited by resources and volunteer time, these values will likely be estimated by the provisional payer organization—members of the core team at Copiosis Headquarters in Portland, Oregon, or local volunteers serving as surrogates of the payer organization.

Questions:

1. **What are the scales for each variable and where do the variables reside? Who determines where on the scale the variable for a product or service should fall?**

Answer: The scales exist as part of the formula in the spreadsheet documentation. The spreadsheet is currently being used to examine test scenarios. These scenarios ensure that formula results are consistent with our expectations. Once the software is complete, these scales will be incorporated into the algorithm and used to replace the various variables.

2. **Is there a way to automate how the variables are populated?**

Answer: Yes. All but one of the variables can be automated through software and connected to data sets for each variable. Data sets are created and updated continuously by the Copiosis Administration/Payer Organization. EB variables are fixed for a period to be determined by the Copiosis Administration and citizen juries. These juries are convened at the end of every rolling period in the same way jury duties are. The juries listen to expert testimony then make decisions on subjective variable inputs for the following rolling period. Jury members earn net benefit award for their service.

3. **How do we make this as easy as possible for the consumer and producer?**

Answer: A department of the Copiosis Administration/Payer Organization will be formed to educate anyone who wishes about the net-benefit calculation. Handheld devices that function as the interface between citizenry and the Copiosis system will also provide background and in-the-moment information to help people choose their actions based on net-benefit calculation. However, one doesn't need to know how the formula functions to earn NBR.

4. **Do we need to create a baseline of all given products and services? How?**

Answer: Yes we do. We will start with the community demonstration projects by creating a base set of products and services based on our knowledge of those communities. Project participants will grow these databases as we realize new or newly discovered services and products.

5. **How are decisions made about the fine-tuning variables?**

Answer: See question 2 above.