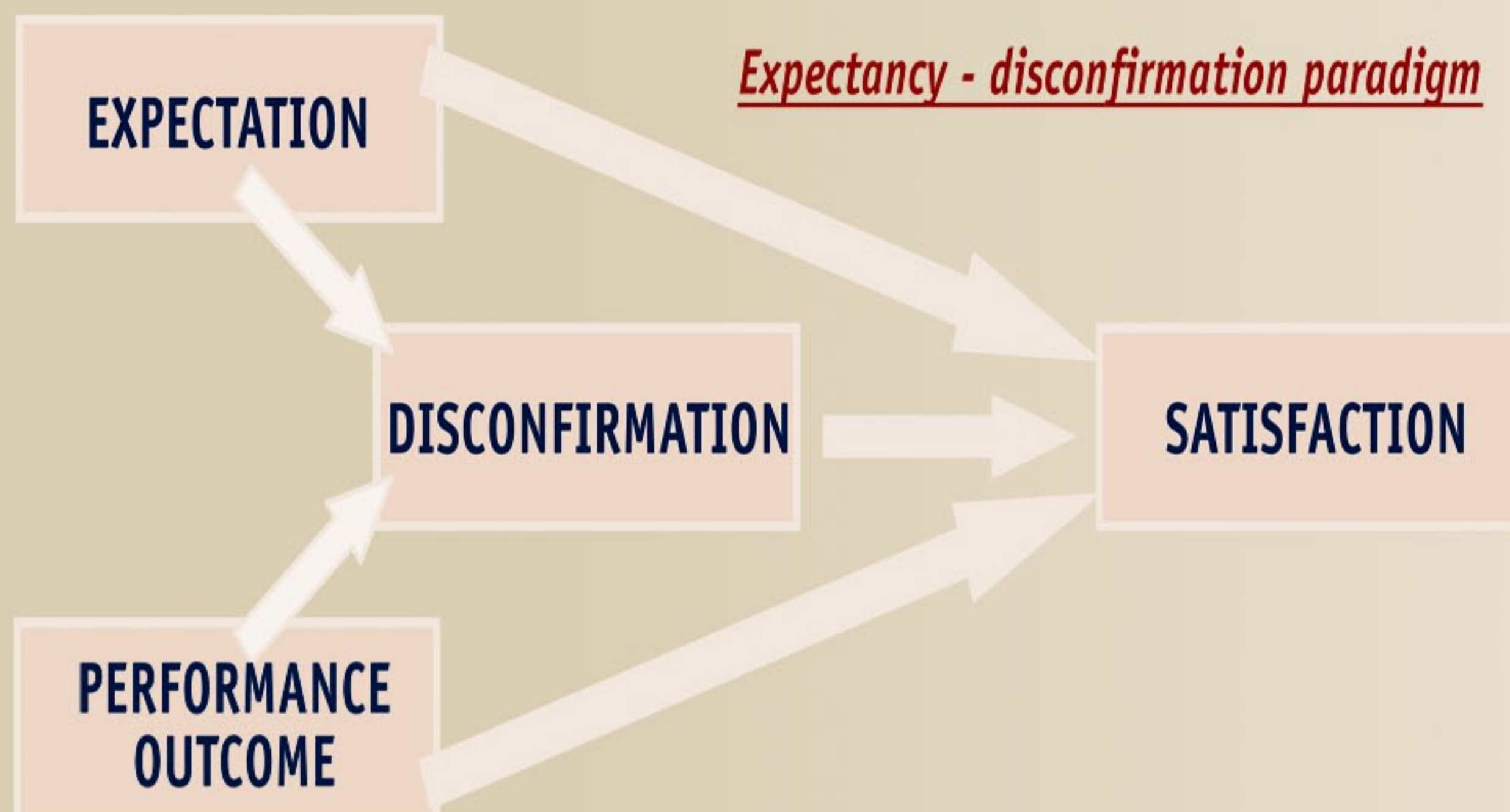


Modeling customer's satisfaction behaviour through uninorms

Benoît Depaire - Koen Vanhoof - Geert Wets
Hasselt University - Data Analysis and Modeling

Customer Satisfaction Behaviour



Remarks:

FIRST: evaluation at product/service attribute level
THEN: aggregation to the overall product/service level

DIRECT MEASUREMENT OF EXPECTATION
=
POTENTIALLY BIASED

Uninorm: a fuzzy set aggregator

Definition

A uninorm U is a mapping $U: [0,1] \times [0,1] \rightarrow [0,1]$ having the following properties:

- 1) $U(a,b) = U(b,a)$
- 2) $U(a,b) \geq U(c,d)$ if $a \geq c$ and $b \geq d$
- 3) $U[a, U(b,c)] = U[U(a,b), c]$
- 4) There exists some element $e \in [0,1]$ called the **identity element** such that for all $a \in [0,1]$: $U(a,e) = a$

Generator function

$$U(\vec{x}) = f[\sum f^{-1}(x_i)]$$

Property:

IF: $f(x)$ is a valid generator function of uninorm U with a identity element e

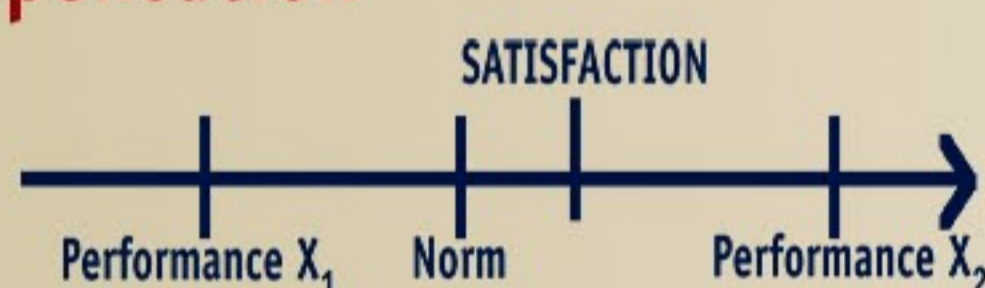
THEN: $f(x+d)$ is a valid generator function of uninorm U_d with a **different identity element** e_d

Modeling Customer Satisfaction through Uninorms

Attribute level aggregation:

Human behaviour

Compensation



Reinforcement



Uninorm properties

$$a > e > b$$

$$\Rightarrow$$

$$\min(a,b) > U(a,b) > \max(a,b)$$

$$a,b > e \Rightarrow U(a,b) > \max(a,b)$$

$$\text{OR}$$

$$a,b < e \Rightarrow U(a,b) < \min(a,b)$$

Customer's expectation:

The uninorm's identity element
= proxy for the customer's expectation/norm

Human behaviour

Different customer's
 \Rightarrow Same behaviour
 \Rightarrow Different expectations

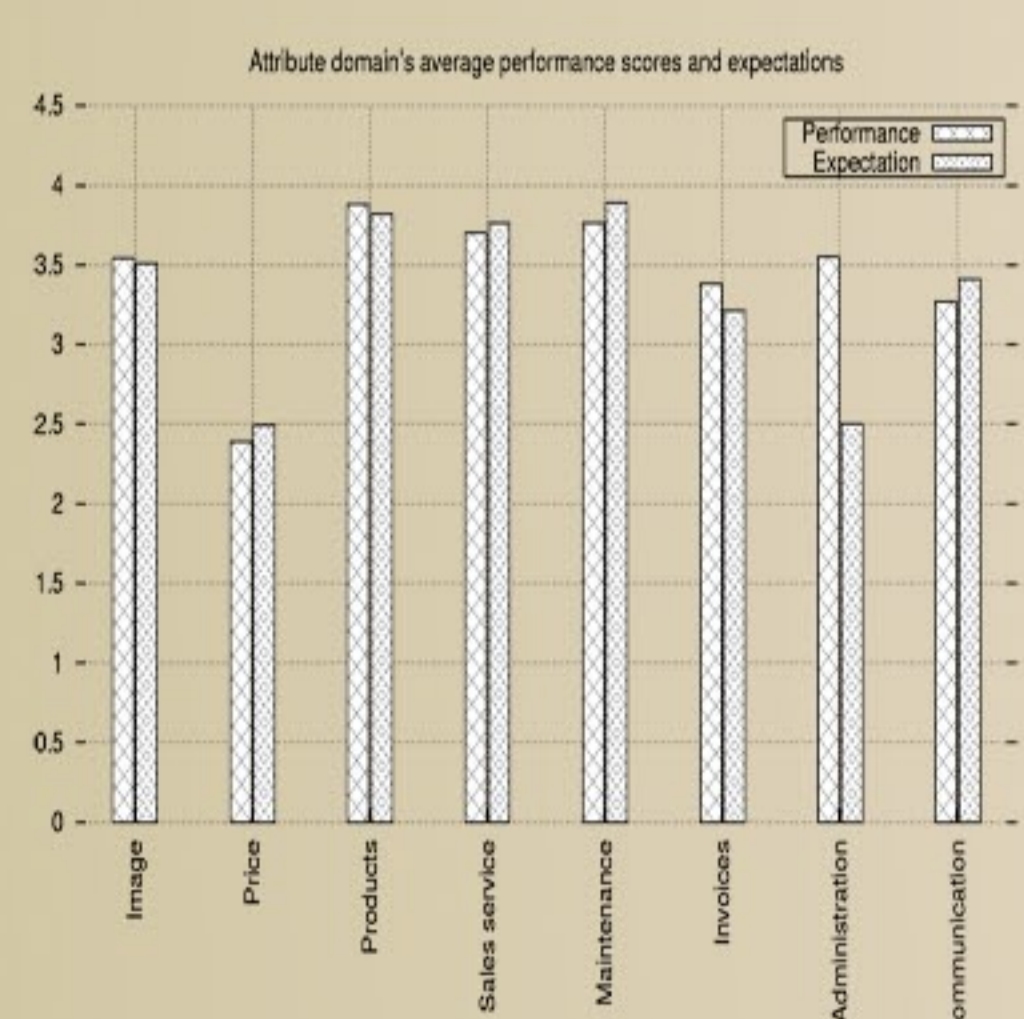
Uninorm properties

One generator function
 \Rightarrow Different uninorms
 \Rightarrow Different identity elements

Uninorm based expectation at the individual customer level

Potential of uninorm based expectation

Attribute performance analysis



Performance only:

Top 3: 'Products', 'Sales Service', 'Maintenance'
Worst: 'Price'

Performance - Expectation:

\Rightarrow 'Price' as good as 'Sales Service' & 'Maintenance'
 \Rightarrow 'Administration' is best attribute

Loyalty analysis

Model 1

- Service satisfaction
- Product satisfaction
- Average service performance
- Average product performance
- Service satisfaction X average service performance
- Product satisfaction X average product performance

Model 2

- Idem model 1
- Service expectation
- Product expectation
- Service satisfaction X service expectation
- Product satisfaction X product expectation

Intend to switch	Accuracy	
	Model 1	Model2
Overall	71.6%	72.1%
Yes	37.8%	43.9%
Maybe	73.2%	72.9%
No	47.2%	51.7%