

RESOURCES ALLOCATION – CAUSAL PROCESS ANALYSIS

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Abstract:

This Paper is built around a Case Study based on Causal Process Analytics to describe the Causal Interdependence between two of the most used variables of a Management Process, the Resource Allocation and its Destination, emphasizing how the two variables are influencing causally one another and how is possible to allocate more efficient Resources using Causal Process Analytics.

The topic is focusing on a completely new approach, with the help of new developed Causal Analytics, on how to distribute Resources during an Industrial or Investment Process in practice and what benefits and challenges, using the presented Case Implementing, might appear.

Key Words: *Causal Processes, Cause and Effect States, Cause and Effect Phases, Causal Objective, Causal Synchronicity Degree, Causal Correlation Degree, Causal Structure Degree, Causality Degree*

1. Resource Allocation Process Description

This Resource Allocation Causal Process Study is trying to show on a simple Numeric Example how the Causality works through the whole Process development, from its initiation till the end, when the Allocation Process is reaching its Objective and becomes part of the Entropic Field, with its achieved Causality Degree (CD). Causality Analysis is going in depth, through all Four Stages of a Bideterministic – Stochastic Process, finding the Causal connection and functionality for two Causal Variables, Resource (R) describing the Resource type (financial, energy, human etc.) and its value or quantity to be allocated, then the Destination (D) or where to Allocate a given Resource (department, investment category, segment etc.)

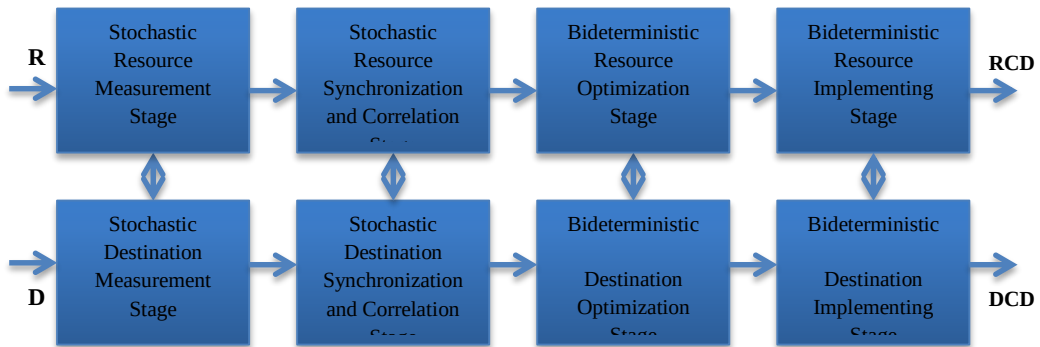
For a better understanding of how the Resource Allocation Causal Process works, the analysis is using Key Causal Indicators as Synchronicity, Correlation, Structure and Causal Degree explaining their significance and how they can be used in practice. Furthermore, to understand the Causality's Framework and what references will be used in this Study, it is necessary to define the basic Causal Process's Stages that are making Universe's Causality Laws working.

Entropic Bideterministic – Stochastic Process Analytics offer all necessary computing tools, to eliminate the unknown, making possible exact and synchronous measurements and analysis of the two un-phased Causal Variables, always using the result of two Causal Aggregated Variables to achieve the Objective's Causality Degree (RCD and DCD). The vast majority of all Field's Processes are basically Stochastic Processes in interaction with a Bideterministic Process, the latest being characterized by its capacity

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to integrate from an Entropic point of view, a Causal Objective into the Field or in other words, among all other Causal Processes.

Taking as model a Bideterministic – Stochastic Process with all Process Stages (*Diagram 1*), with necessary comments and explanations, the Paper will explain, that fundamentally, all Universe's Processes are based on the same Causality mechanisms, the approach presented here, being applicable everywhere for this Hybrid Causal Process category.



1. Causal Bideterministic – Stochastic Process Diagram

2.

The Causal Process's Stages, the Study goes through, for the analyzed Resource Allocation Causal Process are:

- *Measurement Stage* is going to reveal details of the un – phased / asynchronous and uncorrelated Process Variables measuring, explaining the Causality Phases and how the Causality works for this Process category. At this Stage, the physical Causal Variables are converted to their Entropic equivalent.
- *Synchronization and Correlation Stage* is calculating how the asynchronous and uncorrelated Process's Causal Phases can be measured Synchronous using Process's Synchronicity Analytics. Then, based on the calculated Synchronicity Degree, the Correlation Degree of the Causality Phases is emerged as an expression of the Entropy used in the Optimization Stage Analytics.
- *Optimization Stage* is calculating how the Process Causal Phases are evolving, how the Entropy is flowing, being permanently Optimized and kept in balance as function of the Cause / Effect or Effect / Cause Ratio generating the Process Causal Structure Degree, the Quantitative Causal Indicator that shows how the Objective is Structured from an Entropic point of view and how much Cause or Effect Entropy is, in it.
- *Objective Implementing Stage* is calculating the Objective's Causality Degree as part of the Entropic Field, function of the Causal Phases and how the aggregation of the two Causal Phases and the integration of the Objective's Causality Degree within the Field, occurs, being an exclusively Qualitative Causal Indicator. A very refined and high quality Objective is supposing to be one that is perfectly in accord with its projected specifications, and the closer is its Implementing by the

initial specifications the lower is the Causal Degree. A low Causality Degree is incurring Processes with highly ordered or low Entropy, implemented Objectives. This case is issued by the most usual practice in Finance or Industry and input data is describing Resource's type (the Qualitative attribute) and its Quantitative value on one side, then the Destination's Qualitative attribute (department, jurisdiction, industrial sector etc.) and Quantitative attribute or its location / place that is defining the logical or physical coordinates. The answer is given as form of Resource Allocation Objective's Causal Degree, a number showing how well the Resources were allocated throughout the entire Allocation Process, the smaller is the Process Causal Degree the better were the Resources Allocated to reach the proposed Objective.

2. *What is Causality and How it works?*

Causal Processes are characterized by Time Dependent Algorithms and the fact that the Cause – Effect couple is always generated in that order, first the Cause occurs than the Effect is following up.

Causality is a very important issues of our Universe existence, the Laws of Causality are using Time, as reference for Process's Sequentiality that further are going through different development Stages for all existing Processes in order to reach the proposed Objective. The Environment where Causality Laws are functionally is called the Entropic Field. The Entropic Field is the collection of all Causal Processes having as common characteristic the Causal Algorithms that make them run and a Causal Objective that have to be or is already implemented and up and running.

With roots in Thermodynamics and in Information Theory, the Entropy is used to picture the unknown of any System, unknown otherwise represented by Probabilities. The Entropy's formula is given by the logarithm of the ratio between the States of the system, that occur or have the largest probability to occur and the total number of States (States possible and the States impossible) to occur. States are always considered as being Time Dependent, Time being characteristic for each Entropic Dimension either this is describing a Fundamental or a Hybrid Causal Process.

Stochastic Algorithms are the basis for all Causal Analysis where Entropy is a very important issue and have the primary role to convert the Input Entropy to an Output Entropy filling up the specified requirements to make the Causal Objective possible to be achieved accordingly the specifications.

a. Causality Structure

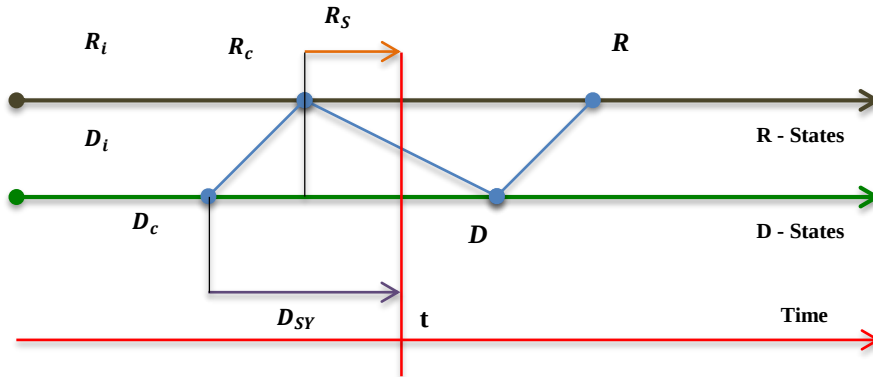
Any Causal Process has a Causal Objective with two components in its Structure, a Cause Objective and an Effect Objective or better known an Expected Result or projected Objective, then an Unexpected Result or the Cause Objective.

Both Cause and Effect Objective are part of the same Implemented Causal Objective, but only the Effect is measurable and visible, the Cause Objective being actually Cause base for the obtained Implemented Objective's Effect.

Any Causal Objective is resultant of a Cause and an Effect Phase, both Causal Phases being described by two variables switching alternatively Causality, being Causally interdependent as it is the well known: Momentum – Position couple (used in physics for a space travelling, elementary particle), Risk – Reward in finance, Decision and its Implementing Time and so on. The entire Universe is full of such examples and its functionality is based on different variables' Causal Phases interdependence.

Furthermore, each Causal Phase is described by Causal States. Each State on a Causal Phase can be first Cause and then Effect, the Causal Phases having the role to describe the Causal Process Development in Time while States having the role to depict the Phase's exact Causality and subsequently Value at a given Time.

For a better reference *Diagram 2* will be a reference for this Study where the Black Line is representing the Causal Phase where Resource States can be either Cause or Effect then the Green Line is representing the Causal Phase where Destination States can be either Cause or Effect.



Causal Phases, States and Synchronous Allocation - Place Diagram

Having this basic knowledge about how Causality works the conclusion is, that any Causal Process has a sequential functionality of its Stages and Causal Phases based on a well established Entropy Flow always from Cause to Effect, in this way being established a Time Based Structured Order of its functionality easy to understand and measure.

b. Causality Functionality

There are several measures (Causal Variables), impossible to assess, simultaneously without adequate Analysis of the Phenomena and its associated Analytics. Heisenberg's Uncertainty Principle is revealing a little bit more the area of Causality when trying to measure simultaneously two Causal Variables regarding them as being neither Synchronous nor Correlated, one Variable being determined by the other Variable, both being un – phased and always changing alternatively Causality through the Causally States they are going through.

In this specific case, changing Causality means, that the Destination as a Cause is primarily considered as Destination State and subsequently once the Destination is determined as a Cause State the Resource is becoming a Resource State.

Considering R – Resource and D – Destination of a Resource Allocation Process, being the Asynchronous measurement values, where R and D couple cannot be simultaneously assessed. At this Time, either R then D can be measured exactly and vice versa. R and D cannot be measured simultaneously and exactly, because they are Asynchronous and Uncorrelated, they are both Phases of Process's Causality, becoming alternatively Cause and Effect one another.

Nowadays, when measuring exactly D , this is measured as Effect while the R is the Cause and vice versa, when measuring exactly R as Effect the D is the Cause.

*Always, is possible to measure exactly **only** the Effect State Value of a Cause State because an Effect State is always changing dynamics its Entropy NOW while the Cause changed its Entropy's dynamics in the past.*

The difference between Cause and Effect from an Entropic point of view is given by the Entropy Ratio between two Causal States and in some situations by the Entropy flow direction between two states. Entropy is always flowing from a High Entropy State to a Low Entropy State. In this situation where the Entropy is flowing back from a new initiated Effect State to the originator, the Cause State belongs to Causal Process Reversibility and is valid only for the distance between two Causal States. The Analytics and description of such type of Processes is not the subject of this Article.

Destination and Effect States are given by the Entropic Causality Equilibrium when the Cause becomes Effect and further on, as Time is increasing, the Effect becomes Cause.

If E_{Dc} is the Entropy of D_c - Destination's Current Value and E_{Rc} is the Entropy of R_c Resource's Current Value if:

$$0 < E_{Rc} < 50\%E_{Dc}$$

then, R_c is the Initiated Effect State of D_c – Cause State and $50\%E_{Dc}$ is the Entropic Causality Equilibrium threshold where R_c becomes Cause (no Causal Reversibility from this Entropy level, upward) for the next Destination State – D , D_c State being not considered as Cause any longer in relation to R_c .

Further on, if:

$$50\%E_{Dc} < E_{Rc} < 100\%E_{Dc}$$

then R_c is considered the Cause for the next Destination State – D .

The conclusion is, that no matter at what Time a Causality State (Effect and Cause or R and D) is measured, one measure is in Cause State and the other one in Effect State and

only the Effect State can be measures exactly as a Causal Variable value, because it is occurring in the very present measuring Time or NOW.

It is important to mention here too, that the Effect State become Cause for next Effect State only if its Entropy level reach 100% otherwise it is still Effect for the previous Cause State or an Effect State is becoming Cause State only if the Entropy transfer from the previous Cause State is totally done. Measuring simultaneously the exact value of both R and D is supposing to find the adjusting Synchronicity Degree (S) for either R or D , that added to a Cause measure value for any R or D , determines its future but current value of its presumed Effect for that measure, supposing that the Entropy transfer from the Cause State to the Effect State is not affected by the interaction with other any Causal Process.

Once the Causality explained both as structure and functionality, it will be easier to find methods to Allocate the right Resource for the right Destination using Causal Analytics, overcoming the challenges given by the current practice where the Resources and their Destinations are not considered Causally Interdependent.

3. Resources Allocation Causal Process Analytics

a. Measurement and Assessment Stage

First, this Study uses specific Analytics to calculate the Causal Indicators including the Resource Allocation Process Causality Degree. There are some important issues to keep in mind, in order to understand better how the preparatory calculation phases functionality is:

- *Resource and Destination Domain* with a Minimum and Maximum value of the Current Resource and Destination Value
- *Current measured Resource and Destination Value* (the exact one being in Effect State and an approximate value of the other one being in Cause State)
- *Granularity or the Pitch size of Resource and Destination Domain*. The granularity of Resource Domain is always the same as the granularity of Destination Domain, each point of granularity the Resource or Destination is in a changing state, i.e. changing its value due to the changing Causality (Resource is impacting on Destination then Destination is impacting on Resource value and so on, changing alternatively the Causality Phase). The Entropic Domain's granularity or the Pitch size is introduced normally by user taking in consideration the accuracy of the targeted result but using this analytics the Pitch size can be optimally determined for the best results. Practically, the more Process Allocations are done through a Process the better is allocated the Resource and easier to adjust next step or Causality States.
- *Conversion* from a physical measure as Destination (coordinates etc.) and Resources (Energy or quantity of money or skills or something easy to quantify) to Entropy is done by the help of Shannon's Information Entropy equation where each variable is assessed accordingly the Theory.
- Destination and Resource State where the Causality is changing, have an associated probability converted further to its equivalent Entropy

Table 1 – Case Study’s Numeric Example Input Data

This Case Study is using a Numeric Example where the Resources have to be allocated throughout all five States of the two Causal Phases and the parameters describing its movement R and D are chosen accordingly *Table 1*. For the Numeric Example, the intermediary Results Tables are representing only the State 5 to exemplify the obtained result.

Preparatory Analytics goes through four important stages, are highly complex, regarding both their explanation and associated Analytics and here, they are only described as functionality. Then, the Case Analysis will be focused only on the Causal Indicators explanation and interpretation. Supplementary computational details can be found in Bibliography. These four preparatory stages needs to calculate:

- *Entropic Domain Upper and Lower Boundaries Analytics*

The Entropic Domain Upper and Lower Boundaries Calculation is the most important step when performing Process Analysis in the Entropic Field. There are three steps to go through and doing the Boundaries Calculation for R and D in order to achieve the exact and easy to use and interpret results:

- *Current Entropic Values Analytics*

The conversion from Standard measuring units to Entropy, allows an easier Analysis with the essence of the Phenomenon and makes unique and easier to calculate and integrate the obtained result into a real measure that can be used in every day life. The Current

<i>Resources - R State (1-5)</i>	State 1	State 2	State 3	State 4	State 5
<i>Resources - R Value</i>	11	7	13	19	17
<i>Destination - D State (2-6)</i>	2	3	4	5	6
<i>Destination - D Value</i>	69	83	59	37	41

Entropic values are represented by *Table 2*.

Measure Description	Current Values	Entropic Values
	RES - R	R_{EC}
Current Value - R_C	17,00	0,3579

Lower Boundary - R_L	6,00	
Upper Boundary - R_U	20,00	
	DEST - D	D_{EC}
Current Value - D_C	41,00	0,0798
Lower Boundary - D_L	36,00	
Upper Boundary - D_U	84,00	

Table 2 – Current Entropic Values

- *Current Minimum and Current Maximum States Analytics*

The minimum and maximum number of States the Causal Process have to go through is necessary, in order to calculate as precise as possible the upper and lower limits of the Domain where the Process is running, for this example in *Table 3* and *Table 4*.

Measure Description	Current Values
	RES - R
Pitch Value - p_R	1,00
Max Possible States - $R_{M(Cs)}$	3
Min Possible States - $R_{m(Cs)}$	11
Total Possible States - R_{Ts}	14
	DEST - D
Pitch Value - p_D	1,00
Max Possible States - $D_{M(Cs)}$	43
Min Possible States - $D_{m(Cs)}$	5
Total Possible States - D_{Ts}	48

Table 3 – Current Minimum and Current Maximum States

Measure Description	Current - 1 States	Pi -Probability
	Values	Current + 1 States
	RES - R	$R_{Mpi(Cs+1)}$

Pitch Value - p_R	1,00	0,29
Max Possible States - $R_{Mpi(Cs+1)}$	4	
Min Possible States - $R_{mpi(Cs-1)}$	10	
Total Possible States - R_{Ts}	14	
	DEST - D	$D_{Mpi(Cs+1)}$
Pitch Value - p_D	1	0,92
Max Possible States - $D_{Mpi(Cs+1)}$	44	
Min Possible States - $D_{mpi(Cs-1)}$	4	
Total Possible States - D_{Ts}	48	

Table 4 – Probabilities for Minimum and Maximum States

- *Entropic Domain Upper and Lower Boundaries Analytics*

To transform further, the Entropic measures in real values, the Entropic Domain must be defined exactly and with the highest possible granularity.

Defining the Entropic Domain's Lower and Upper Boundaries implies an exact definition of the Lowest and Highest Possible State for each measure, R and D and the condition that are determining them.

Measure Description	Current Values	Entropic Current Values
RES Lower Boundary - R_L	6,00	
DEST Low Boundary - D_L	36,00	
Domain Lower Boundary - RD_L		1,81E-02
RES - R Upper Boundary - R_H	20,00	
DEST - D Upper Boundary - D_H	84,00	
Domain Upper Boundary -		1,54E-02

$$RD_H$$

Table 5 - Domain's Lower and Upper Boundaries Calculation

Measure Description	Current	Pi - Probability	Pi -Probability
	Values	Lower Boundary States	Upper Boundary States
	RES- R	$R_{pi(LB)}$	$R_{pi(HB)}$
Pitch Value - p_R	1,00	0,0909	0,0714
Possible States		1	1
Total Possible States - R_{LB} & R_{HB}		11	14
	DEST - D	$D_{pi(LB)}$	$D_{pi(HB)}$
Pitch Value - p_D	1,00	0,0217	0,0213
Possible States		1	1
Total Possible States - D_{LB} & D_{HB}		46	47

Table 6 - Domain's Lower and Upper Boundaries Possible States Probabilities

b. Synchronicity and Correlation Stage

- Synchronicity Degree Analytics

Calculus of Synchronicity Degree for both R and D uses Gamma Function, the result being added to that measure, that cannot be exactly and synchronously determined, making R and D Synchronous and exactly measured. R and D Synchronicity Degree is determined accordingly *Diagram 1*.

The numeric result when R_c and D_c is either Cause or Effect is given by:

R_c - Cause, D_c - Effect: Resource Synchronicity Degree R_s	0,0332
R_c - Effect, D_c - Cause: Destination Synchronicity Degree D_s	0,0991

Table 7 – RD Synchronicity Degree

The exact and synchronous values of either $R - R_{D(t)}$ or $D - D_{R(t)}$ is obtained through one of the two measurements:

- measuring exactly R_C then calculating $D_{R(t)}$ or
- measuring exactly D_C then calculating $R_{D(t)}$

Measure Description	Resource - R_S	Destination - D_S
Synchronicity Degree	0,0332	0,0991
Measured Current Values R_C or D_C	0,3579	0,0798
SYNCHRONOUS VALUES $R_{D(t)}$ or $D_{R(t)}$	0,3911	0,8689

Table 8 – RD Synchronicity Results

- *Correlation Degree Analytics*

Some conclusions regarding the Synchronicity Degree are concentrating on the Causal Process Structure Analysis of the area delimited by the Synchronicity Degree and the Causal Connection or Causal String between R and D in any of their Causal Phase, however an Entropic String Approach being ready to explain how the Correlation Degree works and transfers Causality from Cause to Effect.

Using the already calculated values for R_{EC} and D_{EC} results are:

Resource Correlation Degree - Y_C	1,1307
Destination Correlation - Y_E	4,8074

Table 9 – RD Correlation Degree

The Correlation Degree is the relation between the Cause and Effect being at the same Time a function of Energy. The Higher is the Correlation Degree between Cause and Effect the Higher is the Entropy transferred from Cause to Effect. Correlation Degree is represented by the Causal String that is quantifying the Causality as an Entropy transfer from Cause to Effect where the Entropy is expressed as Mass – Energy, Vibration and Information.

Optimization Stage

The Optimization Stage has the role to find the Optimum Correlation between Cause Phase and Effect Phase with impact for any changes in Process's Causality Phases or in the Correlation Degree. As a function of a Causal Interaction, the Cause Optimization Degree O_C is calculating the equilibrium between R Cause and D Effect using the Correlation Degree Y_C and Y_E Analytics:

$$O_C = Y_C(Y_C/Y_E)$$

For the Numeric Example of Stage 5, the Cause Optimization Degree is given by:

Cause Optimization Degree – O_C	0,2659
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Table 10 – Cause Optimization Degree

In the same way, as a function of a Causal Interaction, the Effect Optimization Degree O_E is calculating the equilibrium between D Cause and R Effect using the Correlation Degree Y_C and Y_E Analytics:

$$O_E = Y_E(Y_E/Y_C)$$

For the Numeric Example, the result is given by:

Effect Optimization Degree – O_E	20,4408
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Table 11 – Effect Optimization Degree

There are two interpretations for the Entropy represented by the Optimization Degree, a Causal and a Physical one.

The Optimization Degree obtained in this case, shows, from a Causal point of view, how close the Cause String Correlations is to generate the next Process's Effect State as function of the Cause – Effect Entropic transfer with other interfering Processes or from a Physical point of view, in what extent the Entropic Causality Equilibrium of Process's Causal State, is reached and the Entropic flow between Cause and Effect is realized.

On the other side, the Higher is the value of the Optimization Degree, then more Causal States will occur during the Process Optimization Stage, and subsequently the Lower is the value of the Optimization Degree then fewer Causal States will occur throughout the Optimization Stage.

Once the Causal Optimization Degree is calculated, the aggregated Structure Degree for all Five Causal States are given by *Table 12* and *Table 13* using:

Causal State	Oc	Oe	Structure Value
State 1	4,146	0,5518	-1,9344
State 2	13,8355	1,9038	44,5555
State 3	1,4852	1,2173	0,1406
State 4	0,4223	29,3730	-36,1429
State 5	0,2659	20,4408	-21,7252

Table 12 – RD States Structure Degree

Based on the equation given by:

$$SD_A = (O_C \ln O_C)(O_E \ln O_E)$$

where the aggregated Structure Degree is the sum of each single Causal State Structure Degree:

RD Aggregated Structure Degree – SD_A	- 15,1064
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Table 13 – RD Aggregated Structure Degree

The interpretation of the Structure Degree in this context is linked to the fact that an Entropy Value of **-15,804** was transferred from Cause to Effect during RD Process Implementing from the Initiation till the end. Minus sign, is expressing the idea that the Process, has an Effect Entropy, was interrupted by other Process and the flow from the last Effect State flow back to the previous Cause State that caused the interaction or impact with the other Process. For an Allocation Process running over a large number of Allocation Destinations or States, R will decrease constantly once each D State is completed or allocated, then the Structure Degree value could be much smaller, then the Process was more naturally developed and its Effect impact over other Processes is minimal.

For all Causal Objectives, SD will always get a negative value for an Effect and positive value for a Cause, featuring in this way the Objective's Entropy flow direction: minus is signifying an Entropic outflow while plus is indicating an Entropic inflow. The smaller is Structure Degree value the lower is the Causal Entropy issued by the implemented Causal Objective (here the right allocation type and quantity at the right destination), here in this case acting as an Effect.

c. Objective Implementing Stage

As any other of previous Process's Stages, the Objective Implementing Stage has the role of finalizing the Process as soon as the proposed Objective is achieved through the Calculation of its Causality Degree, as part of the Entropic Field. Associated to any achieved Objective, the aggregated Causality Degree, has in its structure the Expected Result or the Effect and the Unexpected Result or Cause, the Objective containing all Algorithms, the Process went through all its previous Stages. Any Objective, once implemented has its own Causality Degree acting as an ID on the Causality Degree Ranking Scale.

If Y_C is the Cause Phase Correlation Degree and Y_E is the Effect Phase Correlation Degree then the Process Objective's aggregated Phases Causality Degree CD_A is given by:

$$CD_A = (Y_C \ln Y_C)(Y_E \ln Y_E)$$

The Higher is the Implemented Objective's, Causality Degree, the Higher is its Aggregated Entropy flow between the Causal Phases and vice versa.

The Objective Implementing Stage is a sum of each State Causality, the Implemented Objective's Entropic Causality being given as sum of each State Information Entropy. For the Numeric Example, for all Fives Causal States the result is given by *Table 14*:

Causal State	Yc	Ye	Causal Value
State 1	2,1167	1,0807	0,1331
State 2	7,1422	3,6875	67,5687
State 3	1,3899	1,3007	0,1565
State 4	1,7366	7,1422	13,4587
State 5	1,1307	4,8074	1,0484

Table 14 – RD States Causal Degree

For the aggregated Causality the sum of all Five States Causal Values is given by *Table 15*.

RD Aggregated Causality Degree CD_A	81,370
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Table 15 – RD Aggregated Causality Degree

The interpretation of this result is based on parameters defined in *Table 1*, when the Allocation Process is finished and there are no more Destinations to fulfill is generating a Causal Degree Entropy of **81,370** being at the same Time the Causal Representation of the Process within the Entropic Field might be represented both as a negative or a positive number showing if the Objective is representing a Cause or an Effect Characteristic on the Causality Ranking Scale.

The resulted value is large taking in consideration that another Resource Allocation Process with a CD of **22,34** shows a better Optimized Allocation Structure more properly done accordingly the Environment and the position of the chosen Destination. Doing a fine tuning on both Allocation Value's and shifting or switching the Destination Ranking or order the Causality Degree might decrease substantially.

Causality Degree is always an Effect of an Implemented Objective and it can be regarded as Cause counterpart for another Causal Process, having the Causal Degree in the in the same range.

While the Structure Degree is a Quantitative Indicator showing the quantity of Entropy exchanged by the Causal Objective with the Field, the Causal Degree is a pure Qualitative Indicator showing the Evolution Stage and where in the Ten Entropic Dimension the Causal Objective is situated.

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