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MOEST.

Model of Organizations as an Efficient Systems of Transformation

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Abstract and Keywords

The **objective of this presentation**, for **educational use**, is to develop a **general model** that considers capitalist firms as systems composed of **five interconnected transformers** that implement **five typical transformations**, each of which, operating in conditions of **maximum efficiency**, develops a vital function for the entire organization.The model can be called: **Model of Organizations as Efficient Systems of Transformation**, or **MOEST** and represents the final version of the **MEST** mentioned in the paper by Carlotta Meo Colombo published in this Journal [13(2)].

L'obiettivo di questa presentazione, a scopo didattico, è quello di sviluppare un modello generale che consideri le imprese capitaliste come sistemi composti da cinque trasformatori interconnessi che attuano cinque tipiche trasformazioni, o macro processi, ognuno dei quali, operando in condizioni di massima efficienza, sviluppa un funzione vitale per l'intera organizzazione. Il modello può essere chiamato: Model of Organizations as Efficient Systems of Transformation, o MOEST e rappresenta la versione finale del MEST menzionato nell'articolo di Carlotta Meo Colombo pubblicato su questo Journal [13(2)].

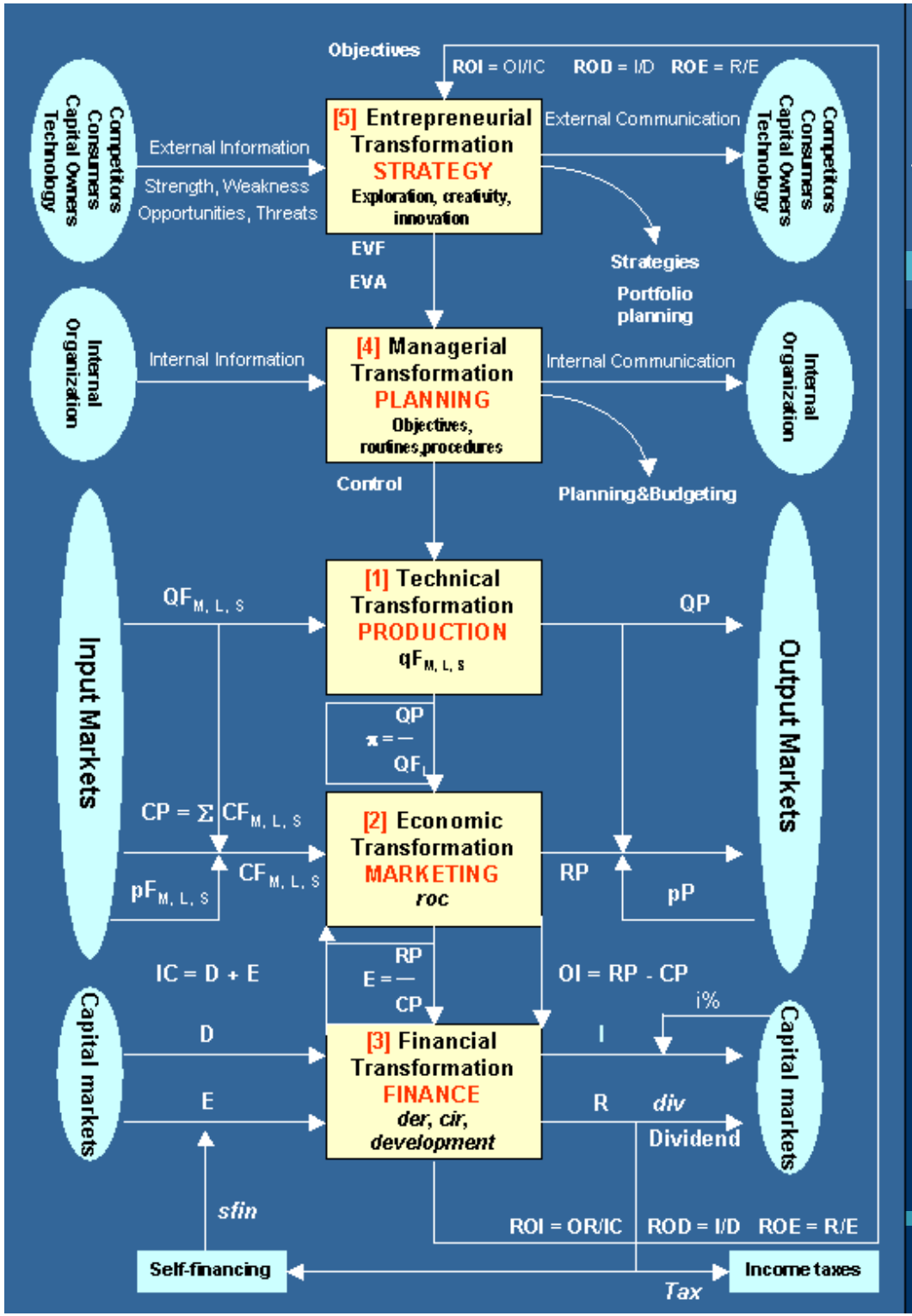
Keywords: Productive transformation, Economic transformation, Financial transformation, Managerial transformation, Entrepreneurial transformation, Business organization, For profit organization, Capitalistic firms, Planning, Strategy

Objectives of this paper

- We try to show that every organization is a system that produces **five basic transformations**:
  - a *productive transformation* of factors into production; this is a transformation of utility, governed by productivity and by quality;
  - an *economic transformation* of costs and revenues into operating income; this is a transformation of value, governed by prices and therefore by the market;
  - a *financial transformation* of capital into returns;
  - an *entrepreneurial transformation* of information into strategies, which leads to a continual readjustment of the firm's strategic position;
  - an *organizational transformation* of strategies into actions of management control, aimed at maximizing efficiency.
- Each transformation is characterized by a level and a degree of efficiency, productive, economic, financial and managerial. All the levels of efficiency are connected in a system of relationships, which represents a basic, simple and effective model for describing the activity of any firm.

From a "functional perspective"

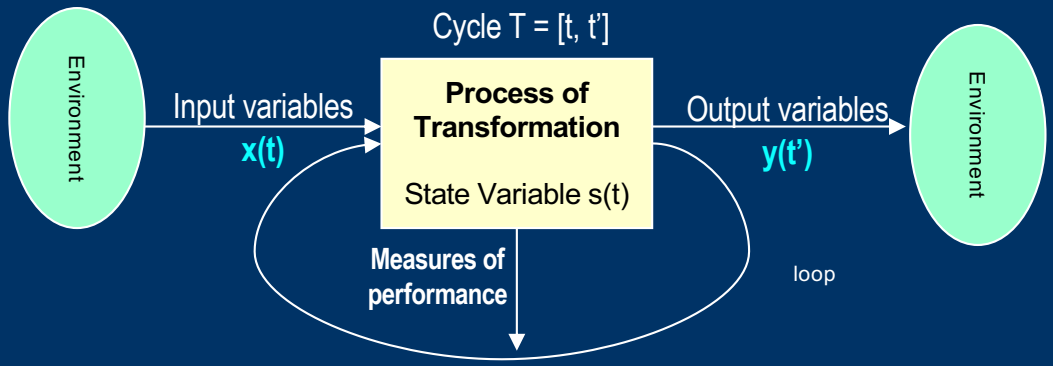
- The model must be considered from a **functional perspective**, as it highlights the vital functions - which must be carried out with maximum efficiency -, without which no organization can live permanently.
- In organizations in which one of these functions fails, or does not operate reaching the maximum efficiency levels, the conditions of survival are compromised up to the point where the conditions of continuity of the system are no longer valid.
- The Model, with appropriate modifications, can be generalized for every kind of production organization, whatever its legal form or size and can also be extended to supply and consumption organizations.



The system of 5 transformations

- I want to guide the reader to understand the general Model of Organizations as Efficient Systems of Transformation, or MOEST, by presenting the main definitions and the formal relationships between the interconnected values that are produced by the MOEST.

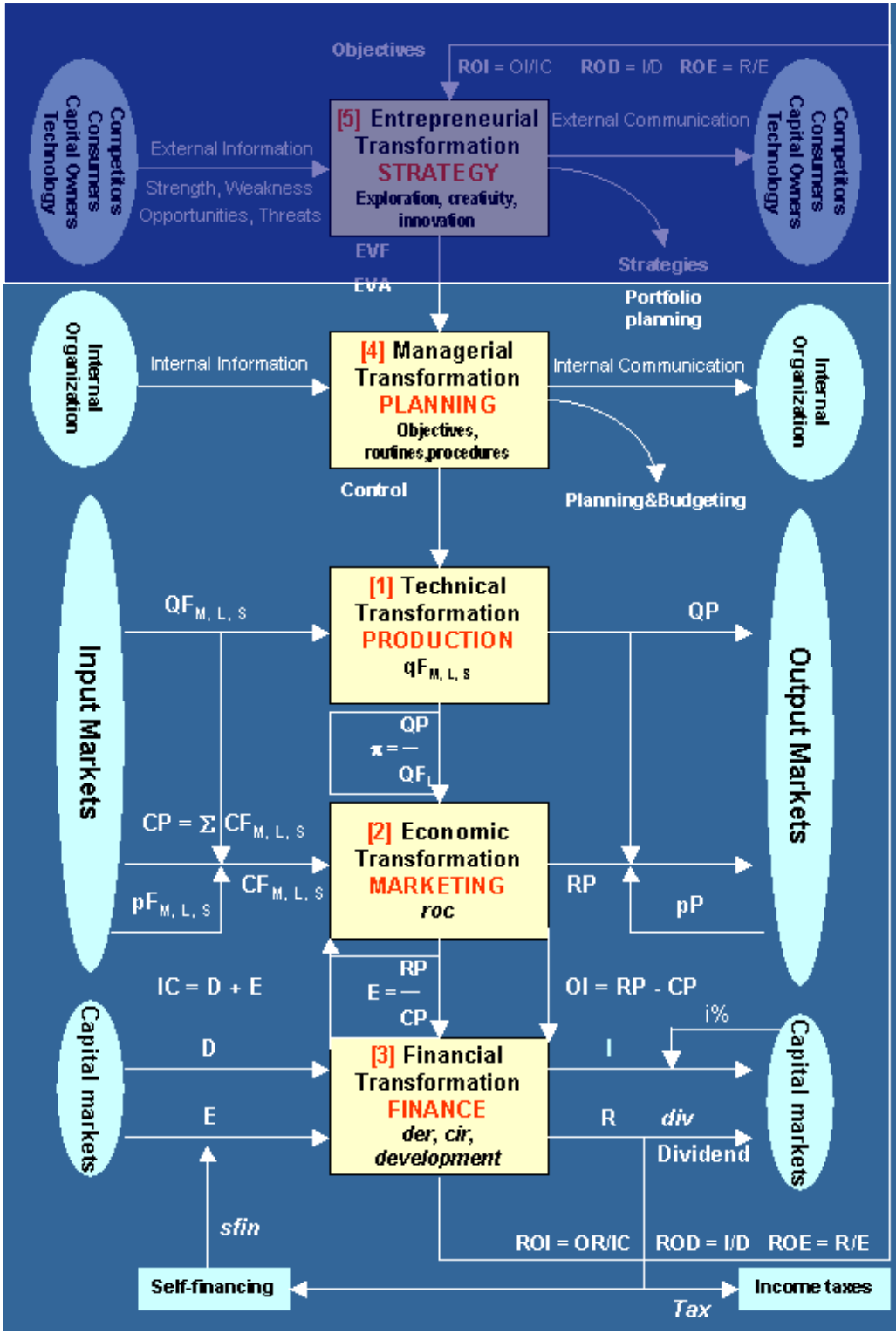
Tool: System of Transformation



This is a system that carries out a process of *transformation* (qualitative or quantitative) of an **input variables x(t)** into an **output variables y(t')** in the cycle period [t, t'], according to an appropriate set of **transformation functions**.

The fundamental **measures of performance** are:

- ***efficiency*** = e(t) = y(t')/x(t)
- ***unit input requirements*** = f(t) = x(t)/y(t')
- ***result*** = R(t) = y(t') – x(t)
- ***return on input*** = roi(t) = R(t)/x(t) = e(t) –1.

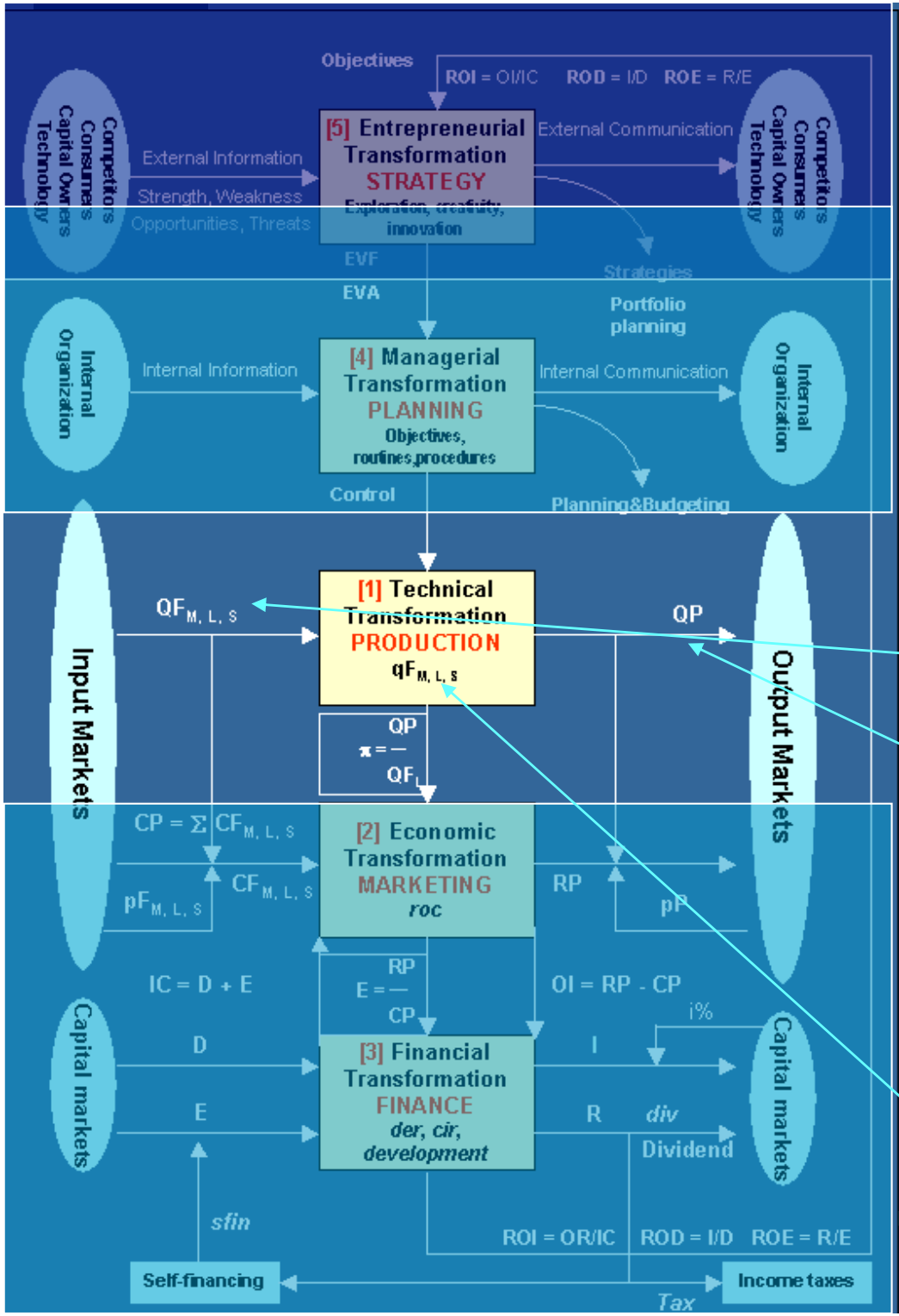


Production oriented organization

Definition 1

A ***production-oriented organization*** is a particular system of transformation consisting of **4** fundamental connected transformations:

1. **Managerial**
2. **Technical** or **productive**
3. **Economic**
4. **Financial.**



Productive transformation

[1] PRODUCTION – This is a transformation of utility.

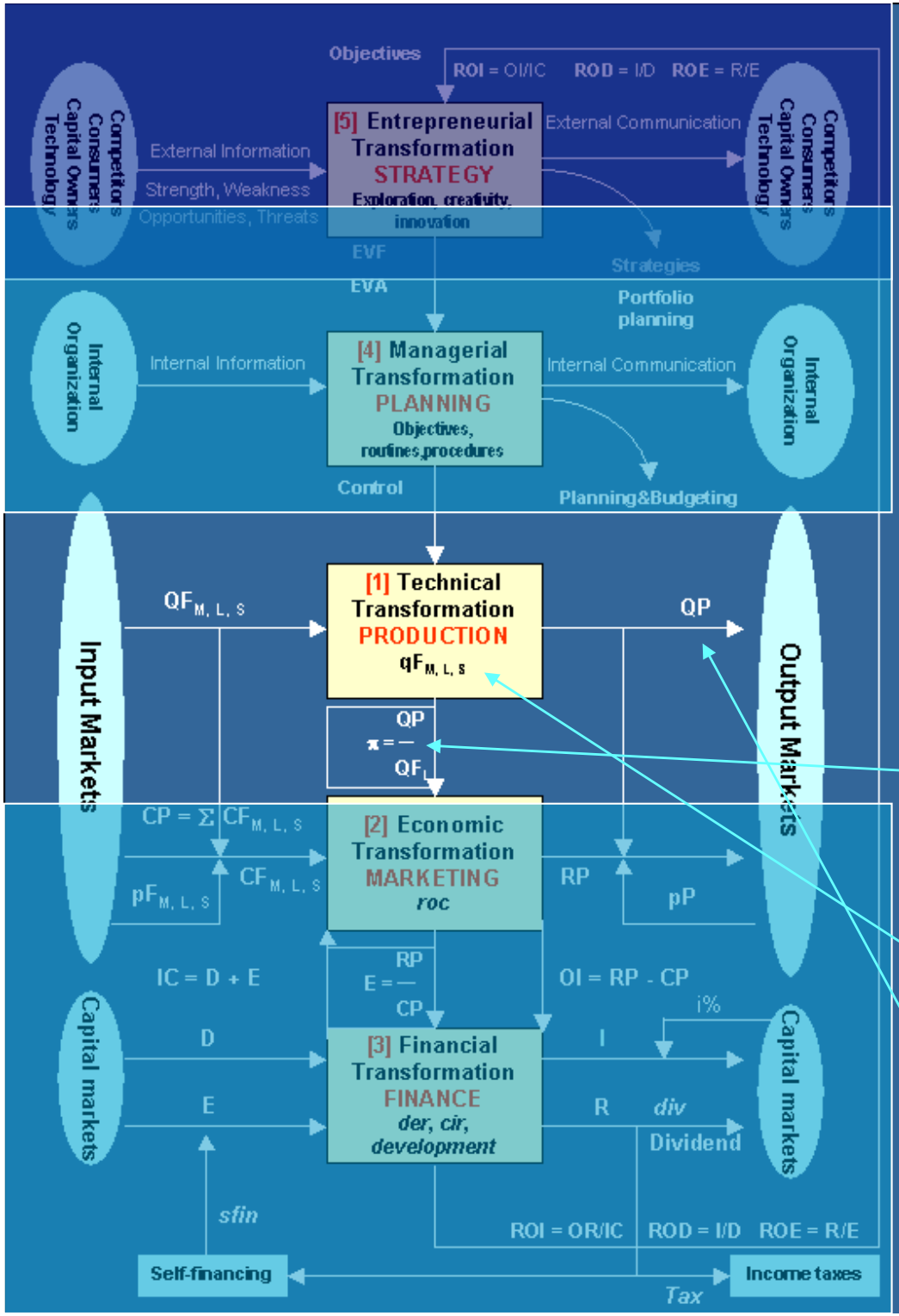
- The system transforms the quantity of factors

$$QF_{M,L,S} = qF_{M,L,S} \times QP = [QM, QL, QS]$$

M = Material, L = Labour, S = Structure

- into quantity of production of a given quality **$QP(\theta)$**
- according to the coefficients of unit input

$qF_{M,L,S}$



Productive transformation

[1] PRODUCTION – Measures of performance.

The principal performance measures test for ***productive efficiency:***

- *average physical productivity*

  $\pi F_{M, L, S} = QP_{\theta}/QF_{M, L, S}$,

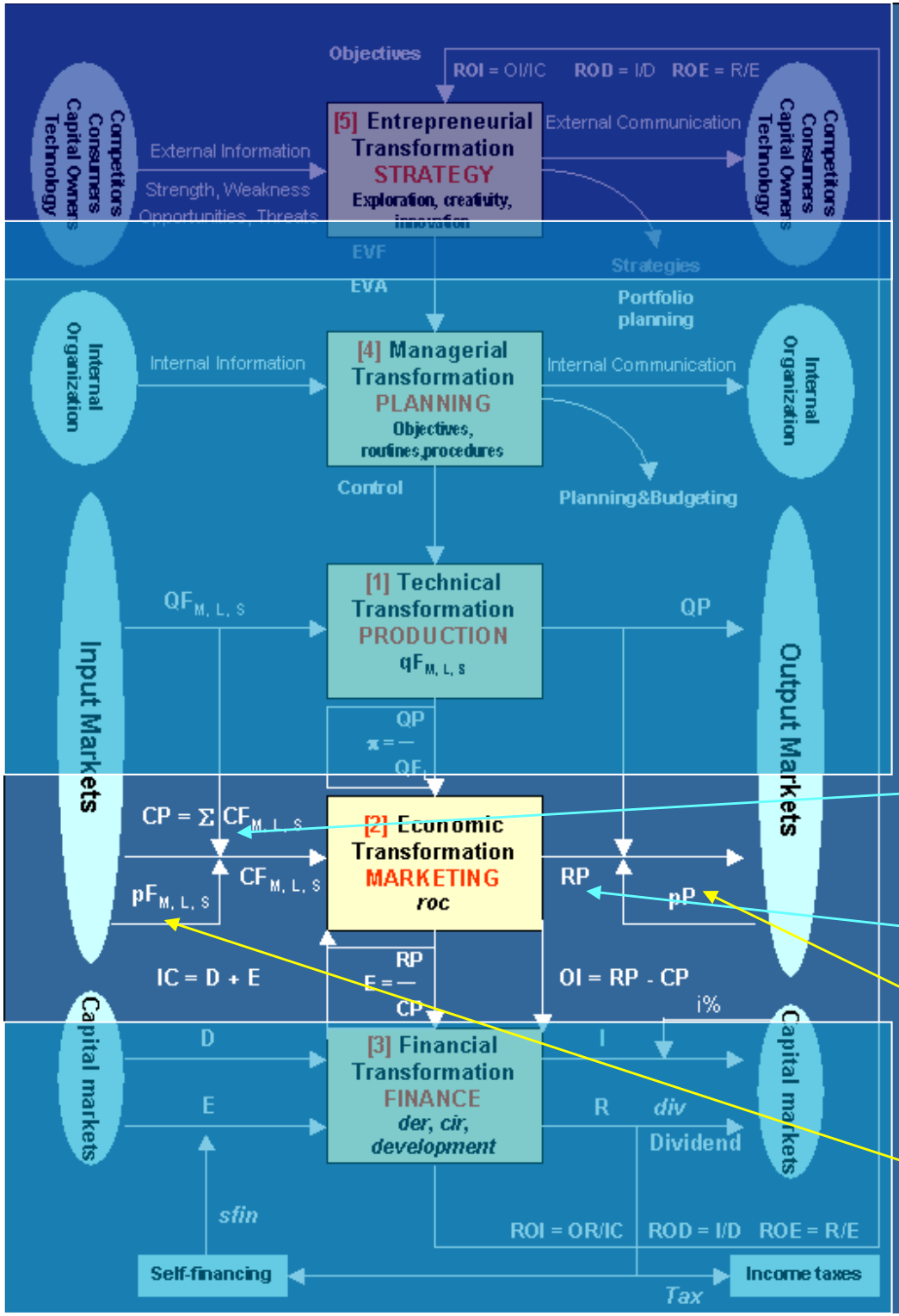
- *average requirement coefficients* for factors

  $qF_{M, L, S}$

- *quality coefficient of production*

  θ

Economic/Market transformation



[2] MARKET TRANSFORMATION

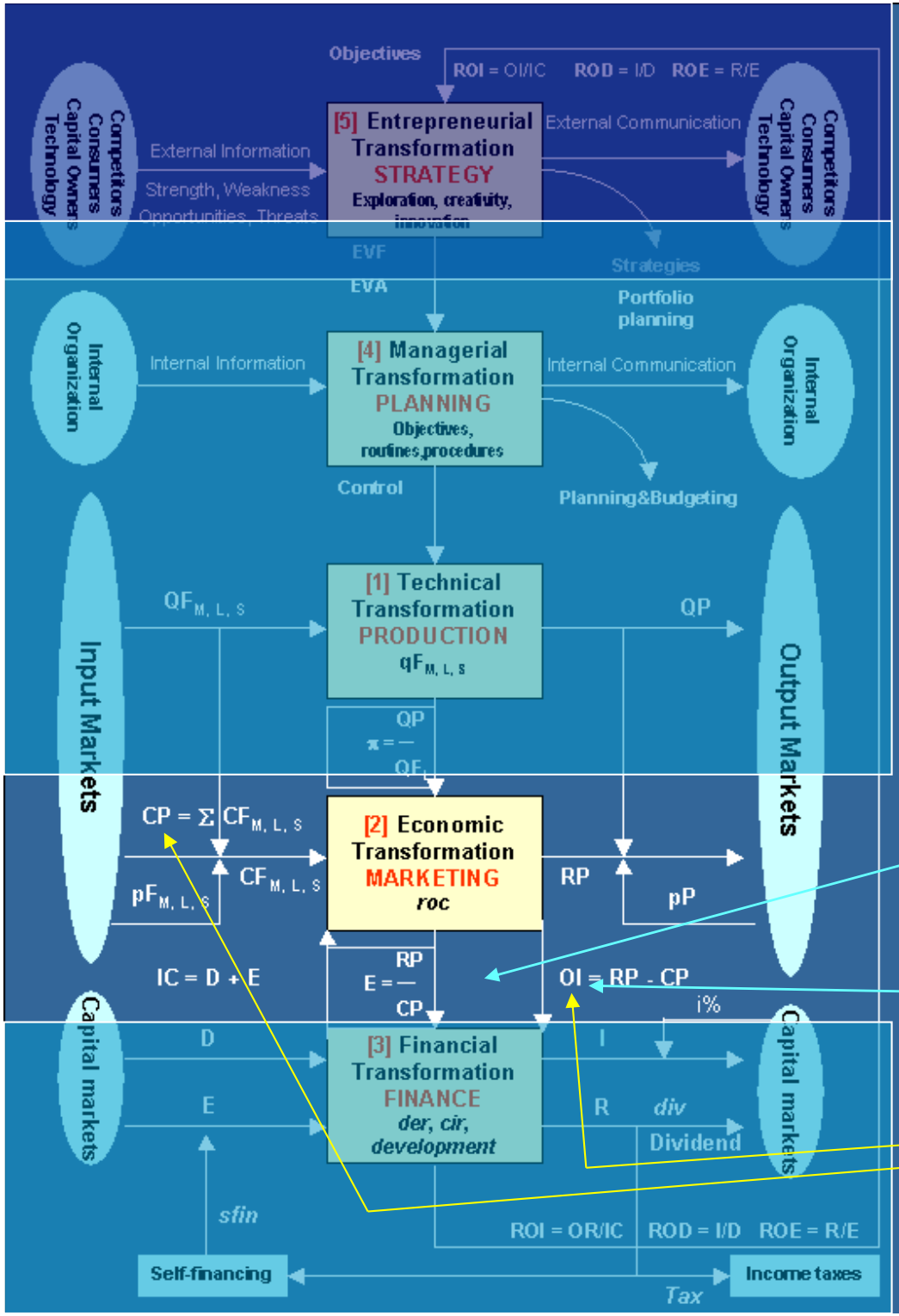
– This is a transformation of value.

- The system transforms costs of factors, that is the **full production cost**

  CP = Σ $CF_{M, L, S}$ = [CM+CL+CS]
- into **revenues** from production

  RP
- according to the average market prices and production costs

$pF_{M, L, S}$ and **pP** and **cP = CP/QP**



Economic/Market transformation

[2] MARKETING – Measures of performance.

The principal performance measures test for ***productive efficiency:***

- *total economic productivity*

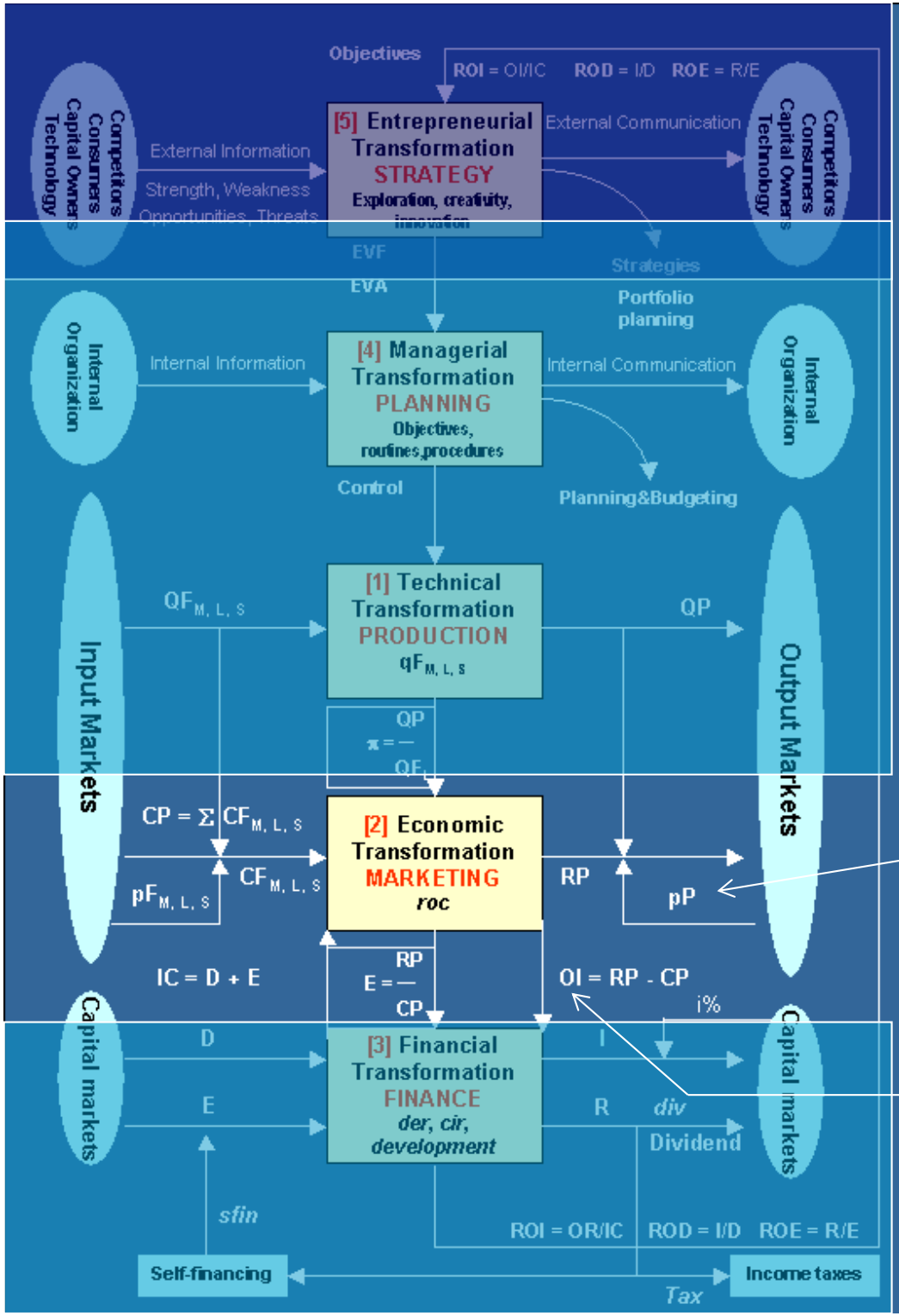
  E(T) = RP(T)/CP(T)

- *operating income*

  OI(T) = RP(T) - CP(T)

- *return on cost*

  roc **= OI/CP**



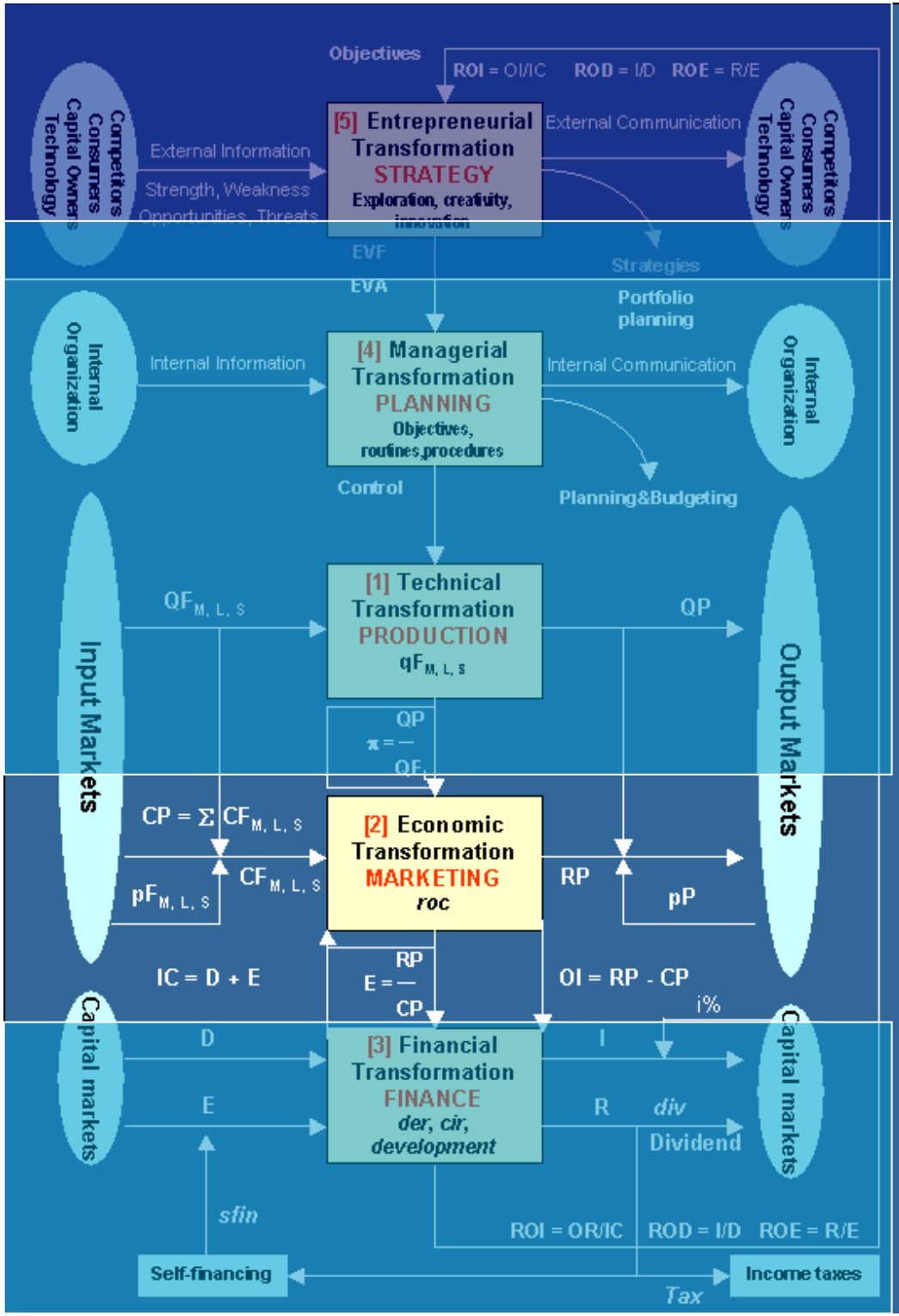
Business Organizations

Definition 2

A ***business organization*** is a particular ***production-oriented organization*** that develops **business**, selling products in ***markets***, at a price

pP≥cP, **cP** = CP/QP

and whose managerial transformation operates to obtain a **non negative OI**.



Profit/non profit Organizations

Definition 3

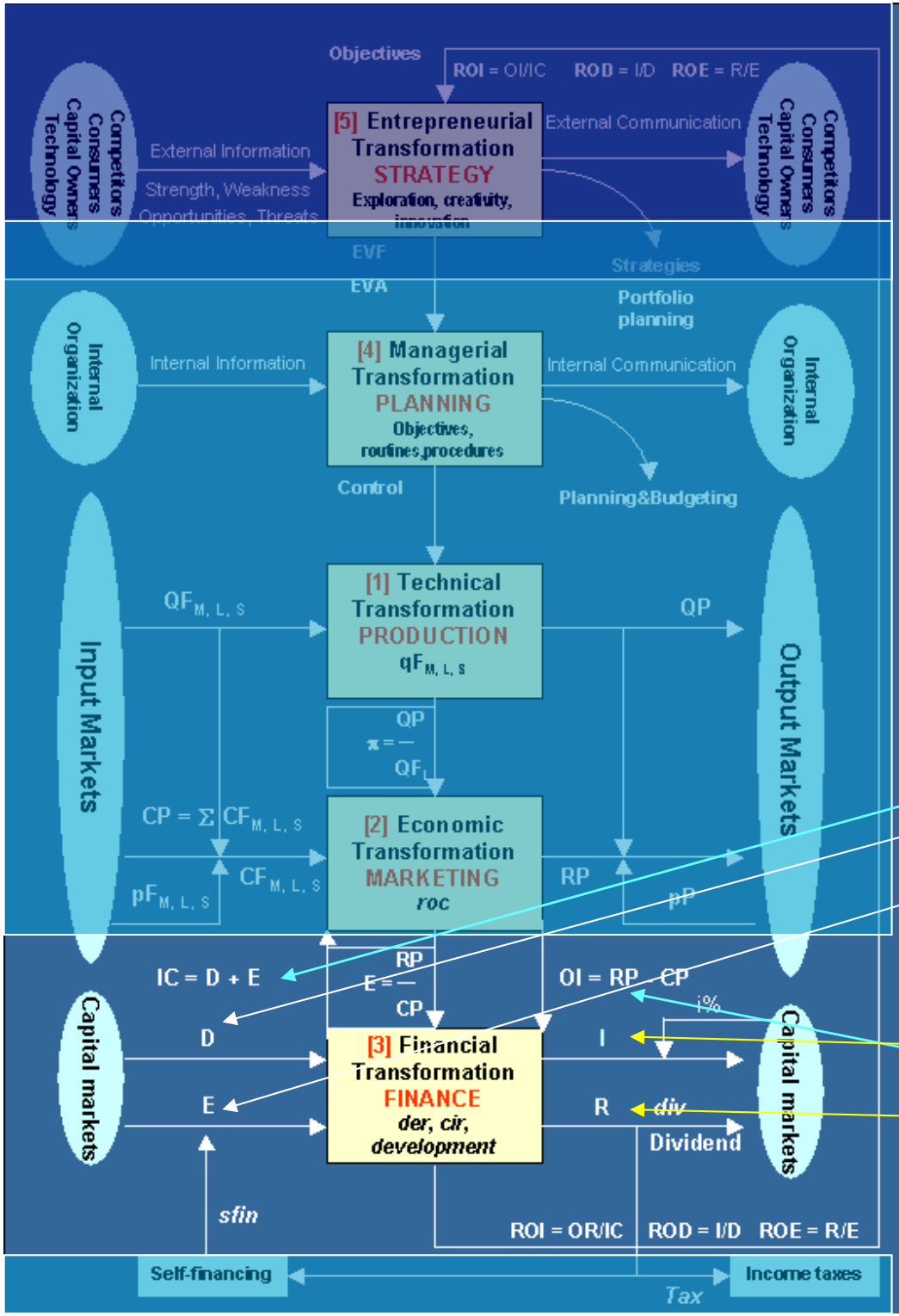
A **business organization** is a

- ***for-profit organization*** if the managerial transformation seeks to pursue the maximum productive and economic performance:

  cP←max→pP

- ***non-profit*** or *not-for-profit* business organization if its objective is to obtain

  cP→min←pP



Financial/Capital transformation

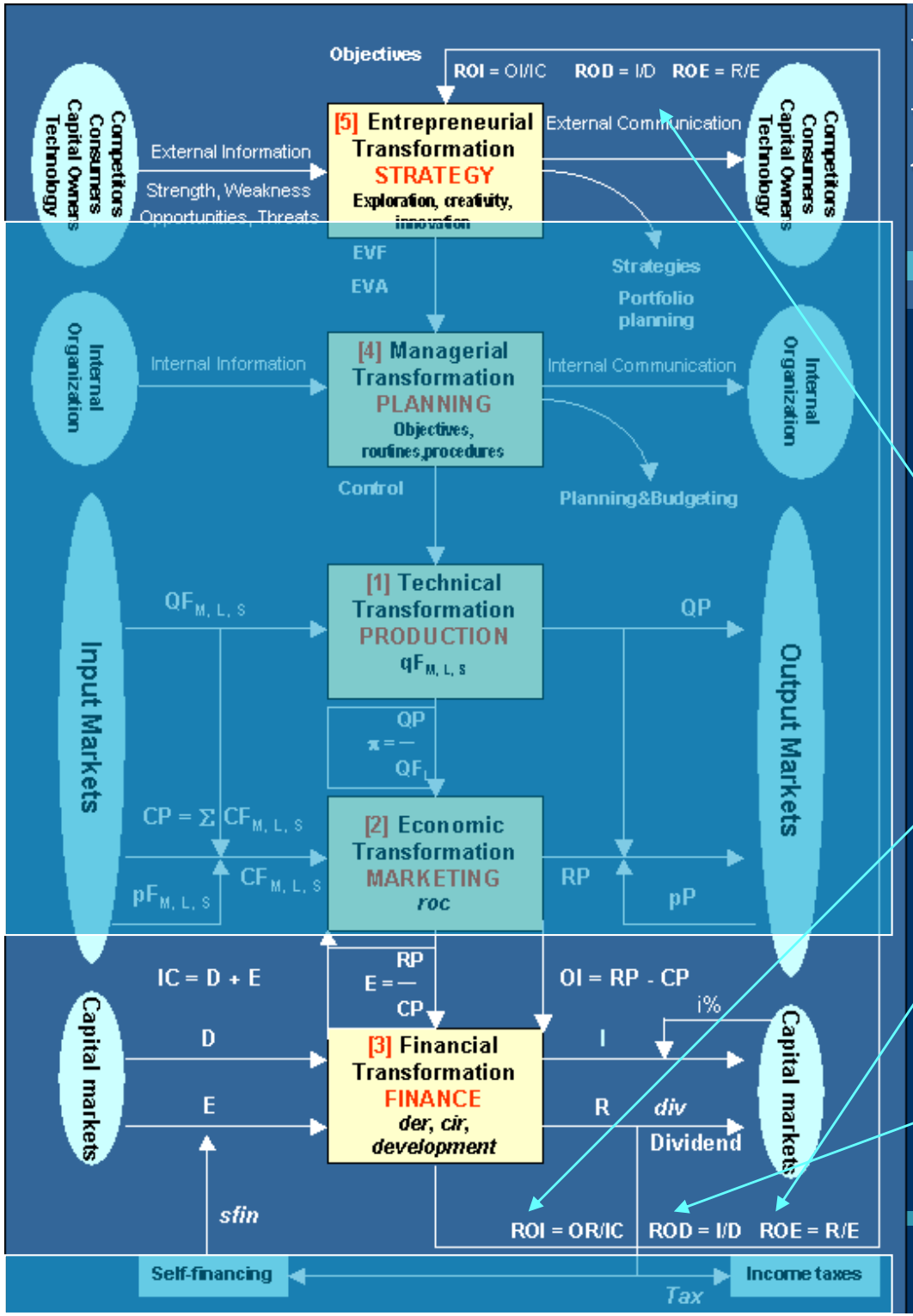
[3] FINANCE – This is a transformation of risks.

- The system transforms Invested Capital (**IC**), Debt (**D**) and Equity (**E**):

IC = D + E

- into Returns: Operating Income (**OI**),Interest (**I**) and Net Income (**R**)

OI = I + R



Financial/Capital transformation

[3] FINANCE – Measures of performance.

The principal performance measures test for ***financial efficiency:***

- *return on invested capital*

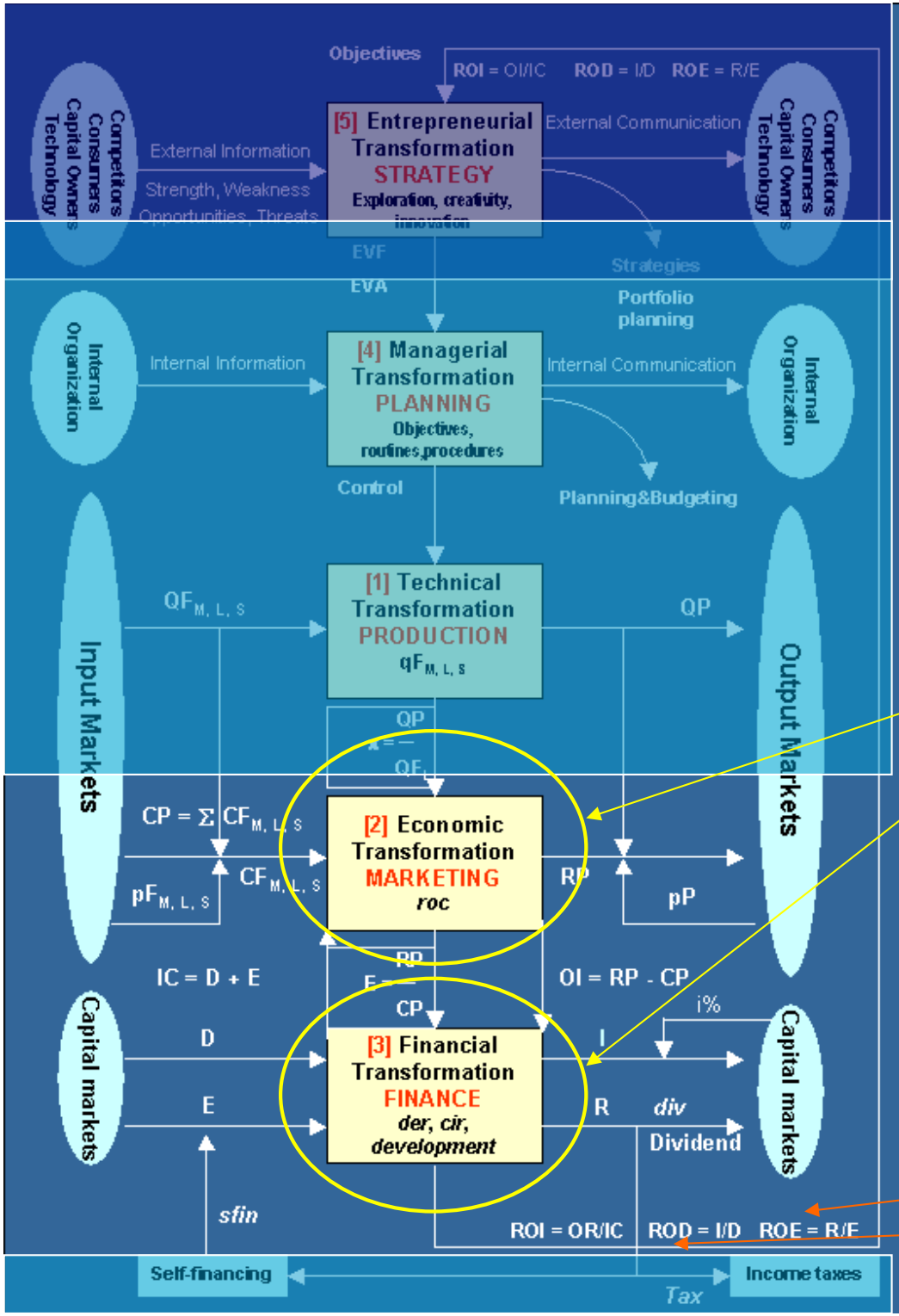
  ROI **= OI/IC = (R+E)/(E+D)**

- *return on equity*

  ROE **= R / E**

- *return on debt*

  ROD **= I / D**



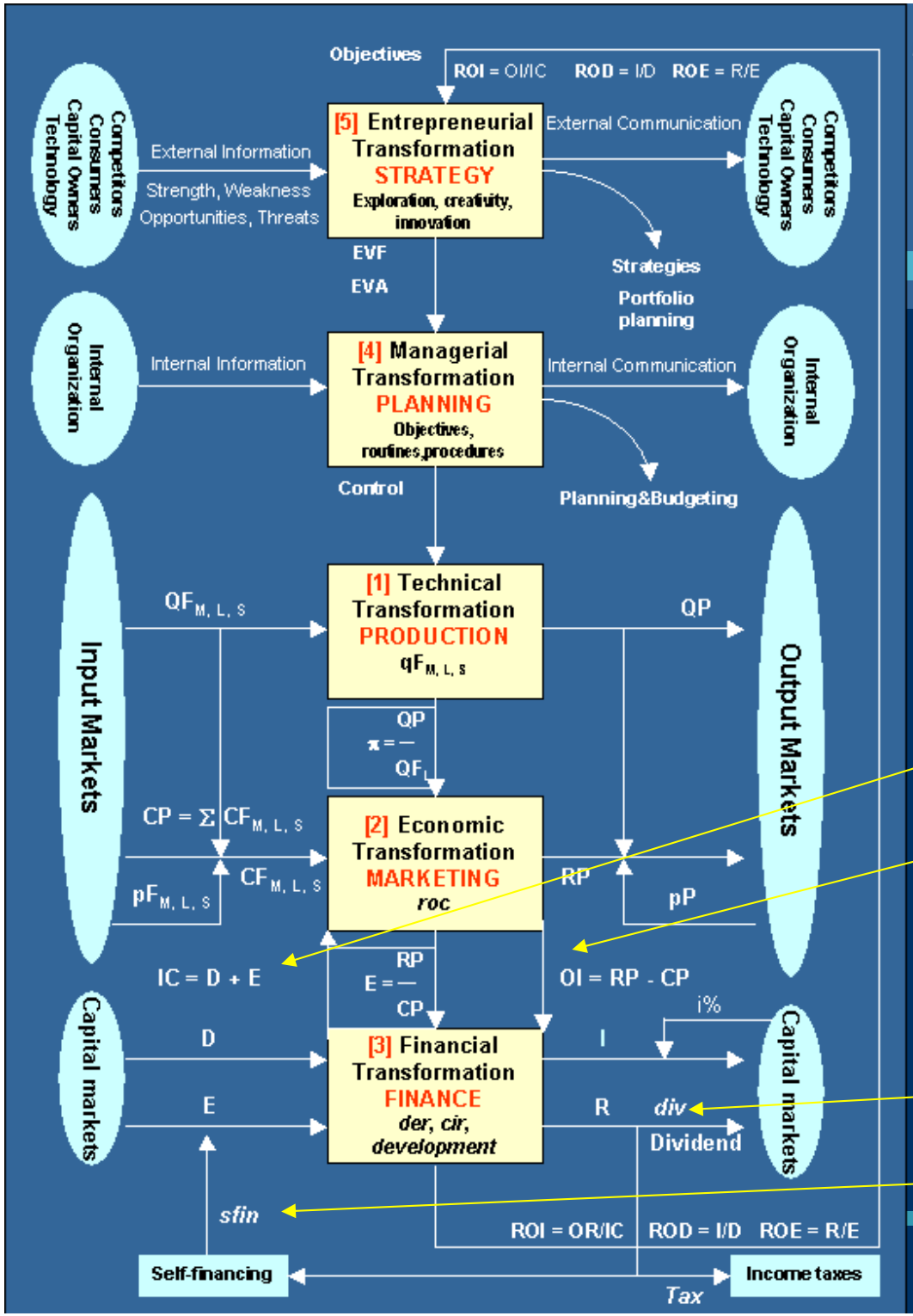
Capitalistic Firm

Definition 4

A **capitalistic firm** is an autonomous **for profit business organization** that

- develops a ***business portfolio***
- activates a ***financing portfolio***
- accepts the **system of risks**
- is constituted in order to maintain **$E(t_0)$** financially integral
- and thus pursues:

  max *ROE* and **min *ROD*.**



The Balance Sheet Equations

In **capitalistic firms** capitals and incomes are connected by the following Equations:

KL + IC = D + E

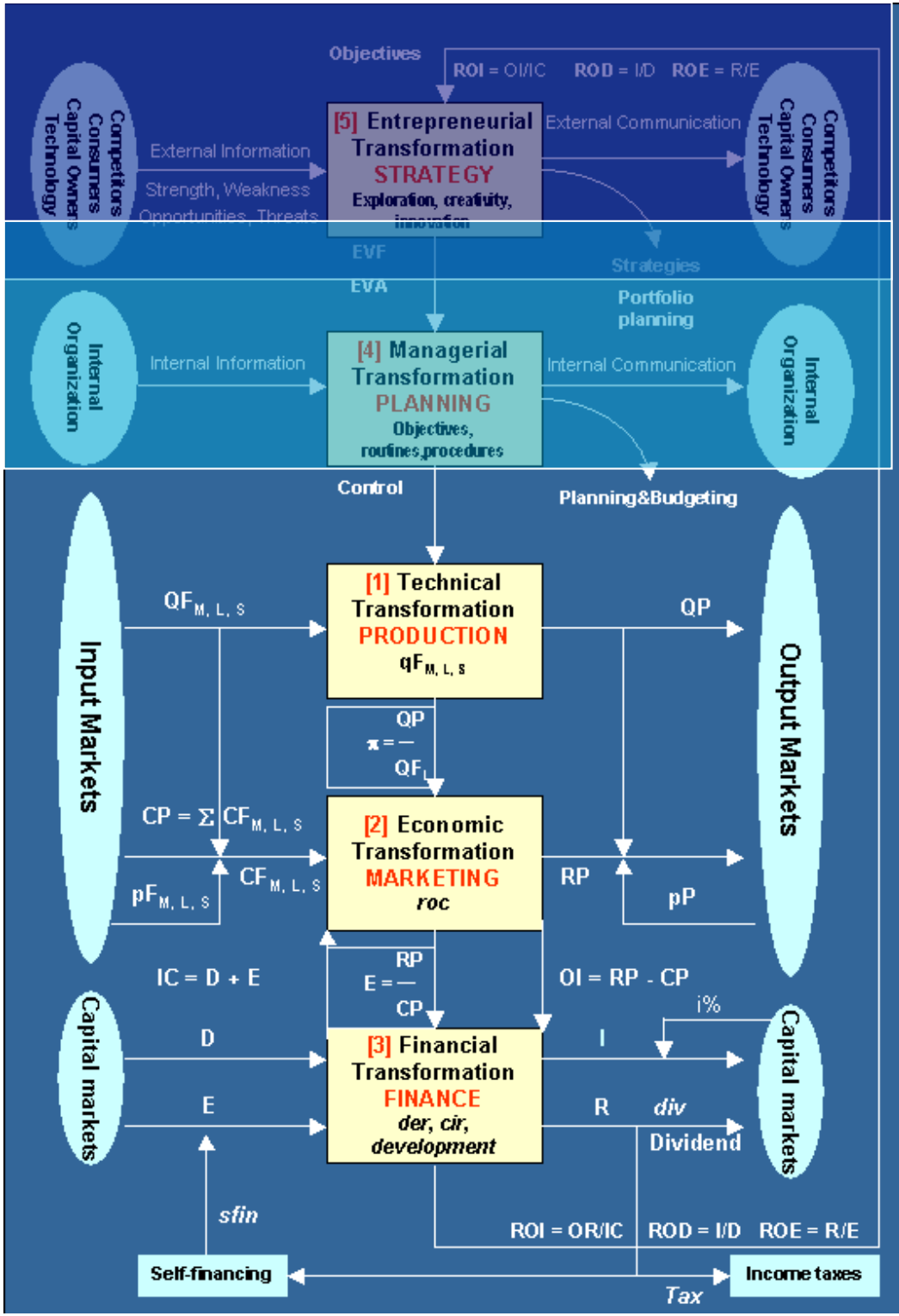
OI = RP – $CF_{M, L, s}$ – D i =

= *Tax* + *div* + *sfin*

KL = liquidity

***div* = dividends**

***sfin* = self-financing**



The Economic Equation

The productive, economic and financial transformations are connected by the *economic relation*:

OI = (pP – cM – cL) QP_θ – CS =
= cm QP_θ – FC

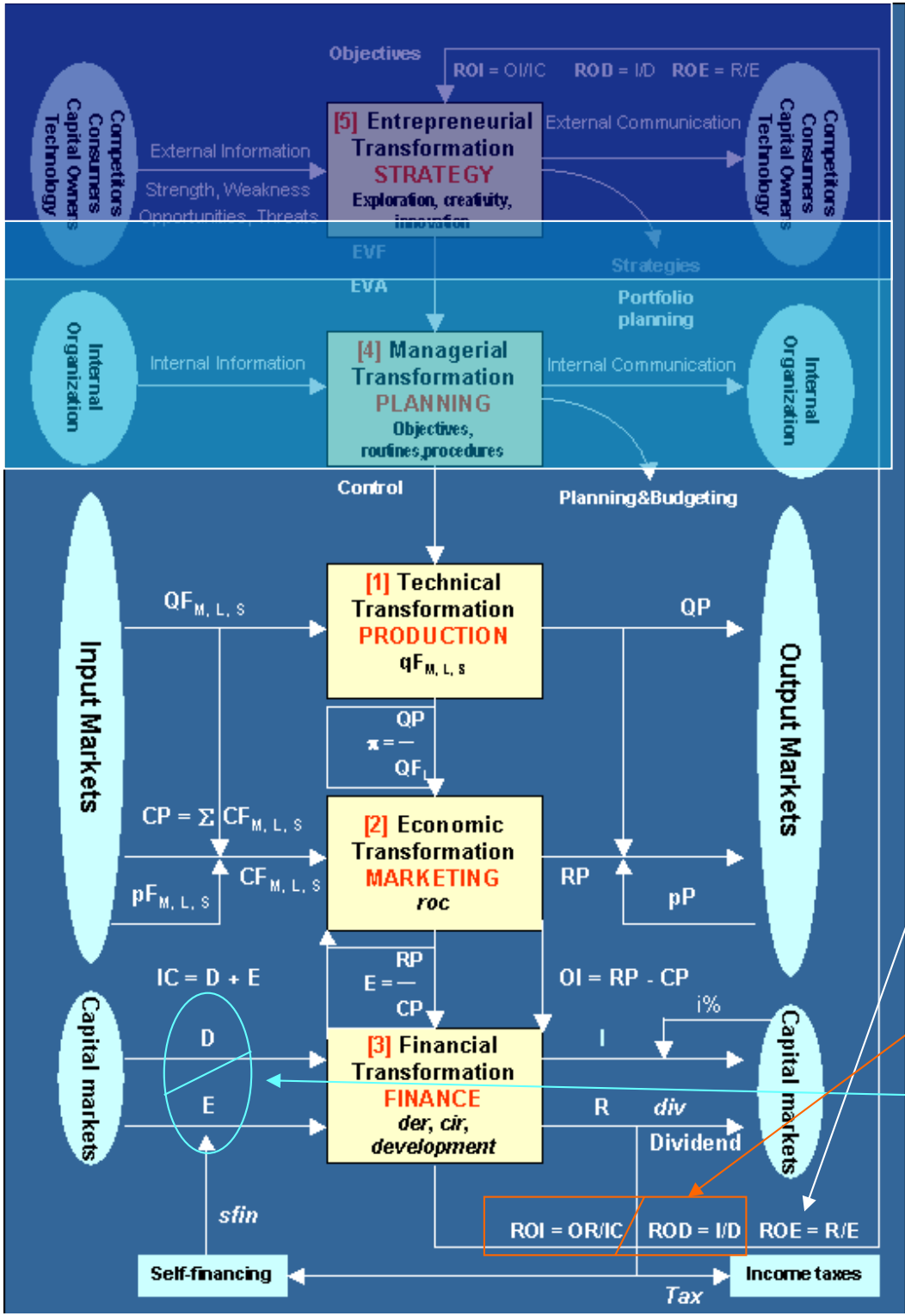
cm = **pP – vc** = contribution margin

vc = **cM + cL** = unit variable cost

CS = **FC** = fixed costs

with the capacity constraint:

$QF_{M,L,S} = QP_\theta \, qF_{M,L,S} \leq Qf^{max}$



The Financial Equation

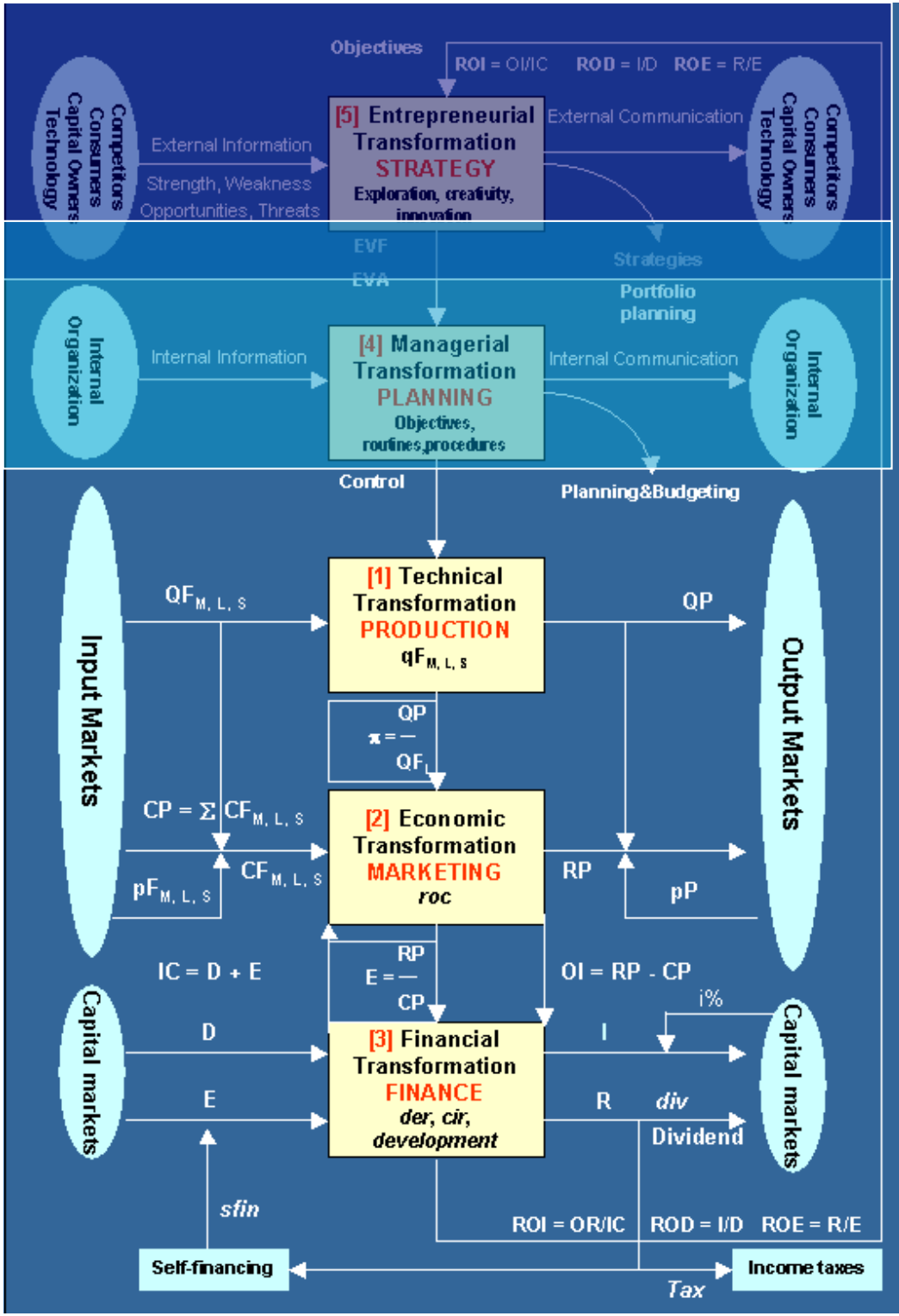
The productive, economic and financial transformations are connected by the *financial equation* (Modigliani and Miller):

ROE = EOI + spread × der

where:

spread = ROI – ROD

***der* = D / E**



The Fundamental System of Ratios

The productive, economic and financial transformations are connected by the *fundamental system of ratios:*

$$roe = \frac{IC}{E} \frac{CP}{IC} \frac{RP}{CP} \frac{OI}{RP} \frac{R}{OI}$$

ier = invested / equity ratio

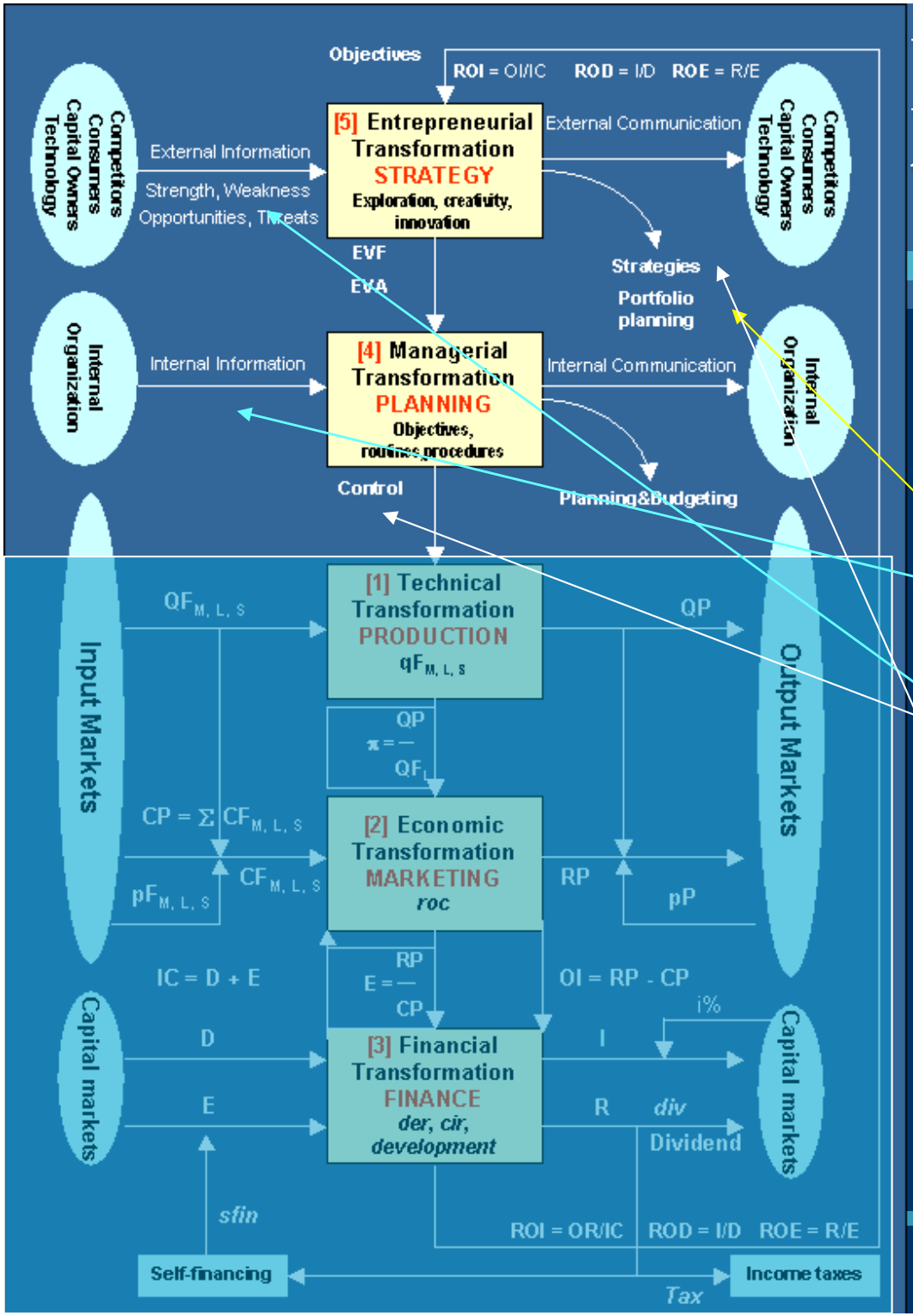
cir = cost / investment ratio

E = economic efficiency

ros = return on sales

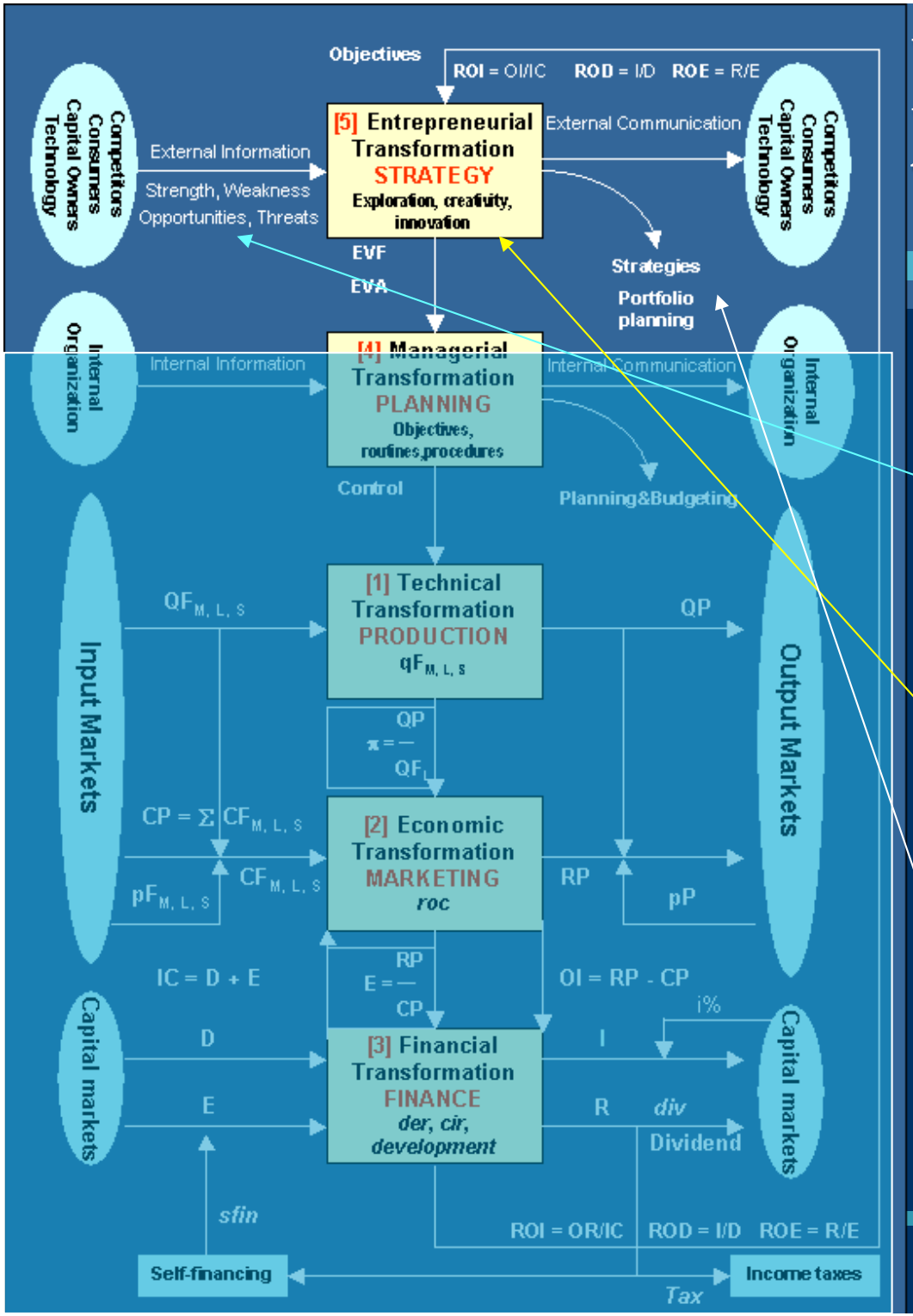
nor = (net / operating) ratio

Managerial transformation



[4] PLANNING – This is a transformation of strategies into actions and controls

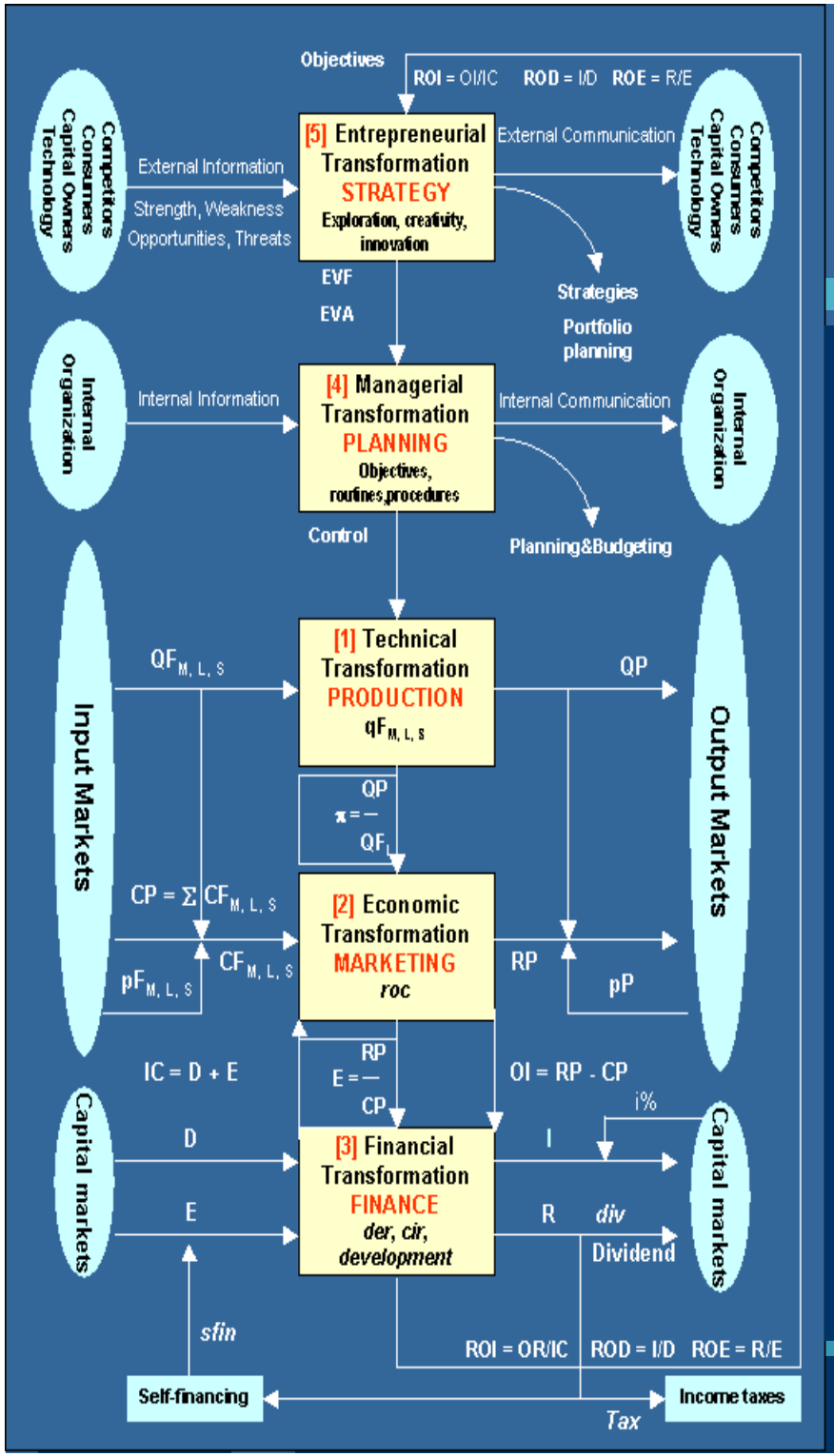
- The system transforms **internal** and **external information** into **decision** rules, internal communication and **controls** in order to achieve **strategies**.



Entrepreneurial transformation

[5] STRATEGY – This is a transformation of external information into strategy through creative thinking.

- The system transforms **external information and representations** of the environment (input) into changes in the ***strategic position*** of the firm (output) to create the **optimal mix** of the *business* and *financing portfolios.*



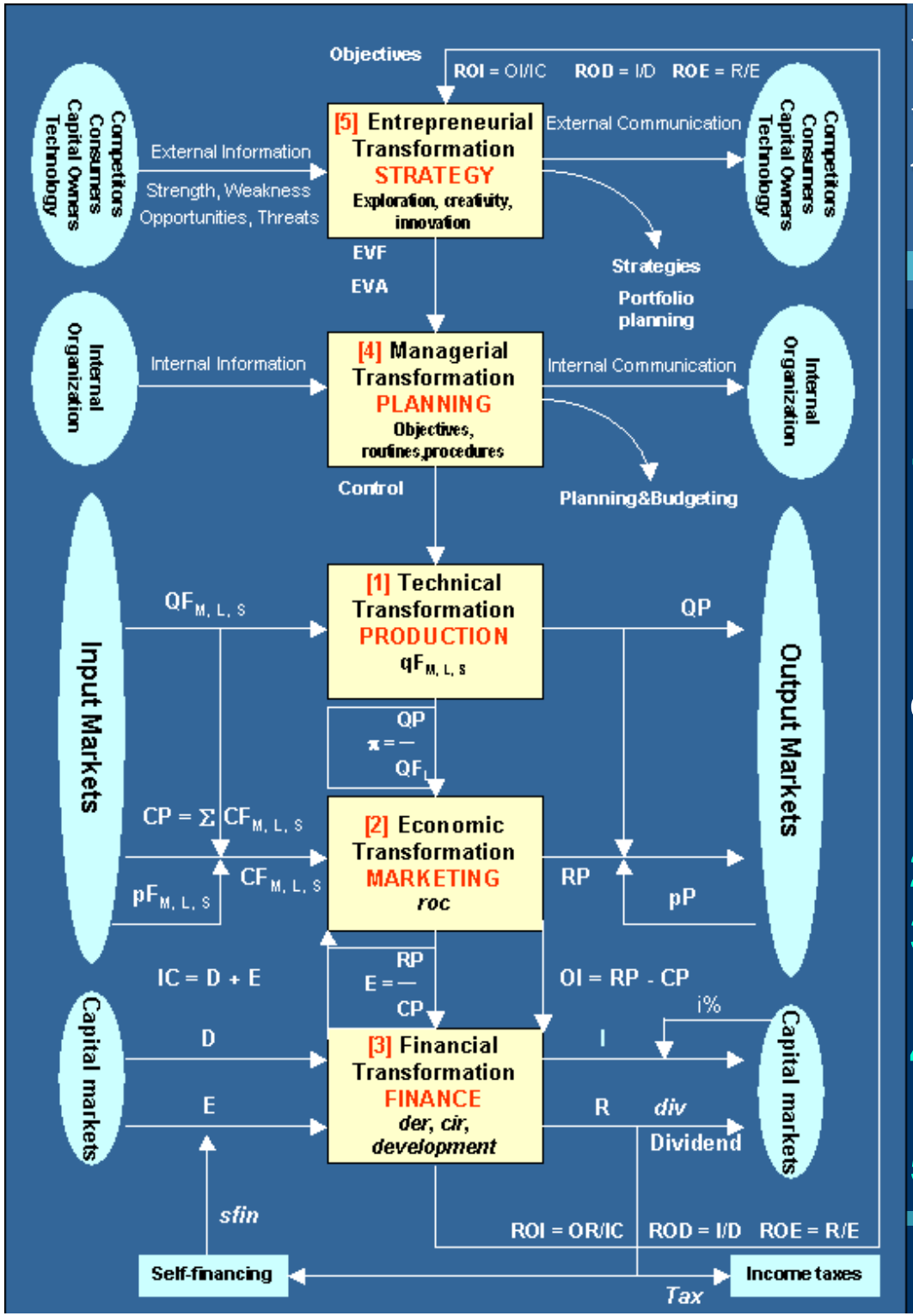
Managerial transformation

[4] PLANNING – Economic efficiency is achieved through a mix of production and marketing efficiency.

$$E = \frac{QP_q}{QF_{M,L,S}} \frac{pP}{pF_{M,L,S}} = \pi F_{M,L,S} \frac{pP}{pF_{M,L,S}}$$

The profit organizations that mainly pursue max**e(T)** = max**OI(T)** through max $\pi F_{M,L,S}$ can be defined as *production efficient*.

Those that mainly pursue max**e(T)** = max**OI(T)** through max $(pP / pF_{M,L,S})$ can be defined as *marketing efficient*.



Entrepreneurial transformation

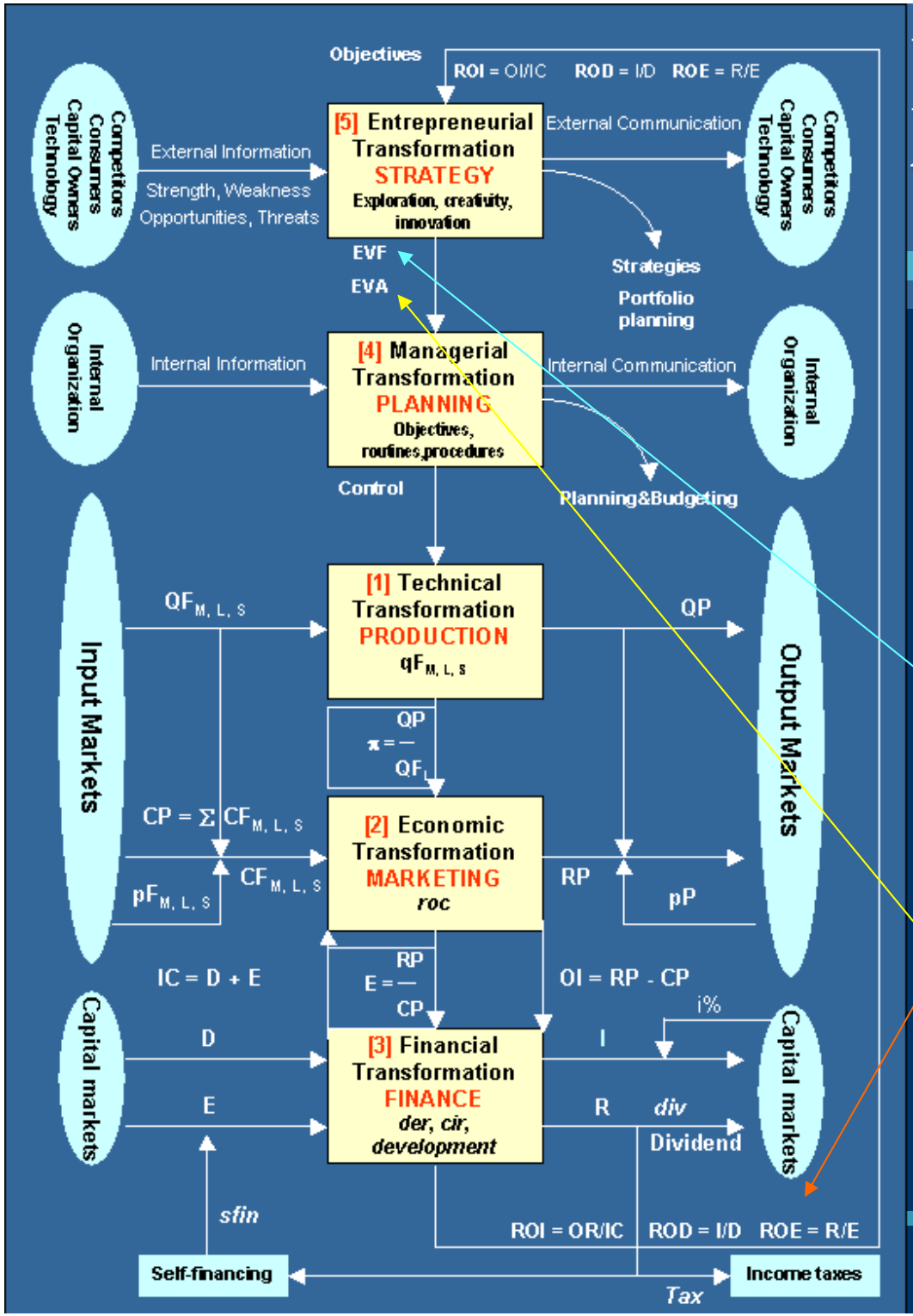
[5] STRATEGY – The portfolio policy

1. choose those investments having:

   $ROI \geq \min ROI^*$ for the entire firm; if there is more than one, choose that having the maximum *ROI;*

or, in any event having $ROI \geq ROD$ for the correlated financing and sufficient to guarantee $\min ROE^*$;

2. choose the financings with min*rod*;
3. if *ROD*<*ROI*, increase D and reduce E, or move on to rule 1);
4. substitute, when possible, investment I with J if *ROI*(J) > *ROIi*(I);
5. substitute, when possible, the financing F with G if *ROD*(G) < *ROD*(F).



Entrepreneurial transformation

[5] STRATEGY – Measures of performance.

The principal measures of performance are:

- *Economic Value of the Firm*

  EVF **= R /** ***ROE°***

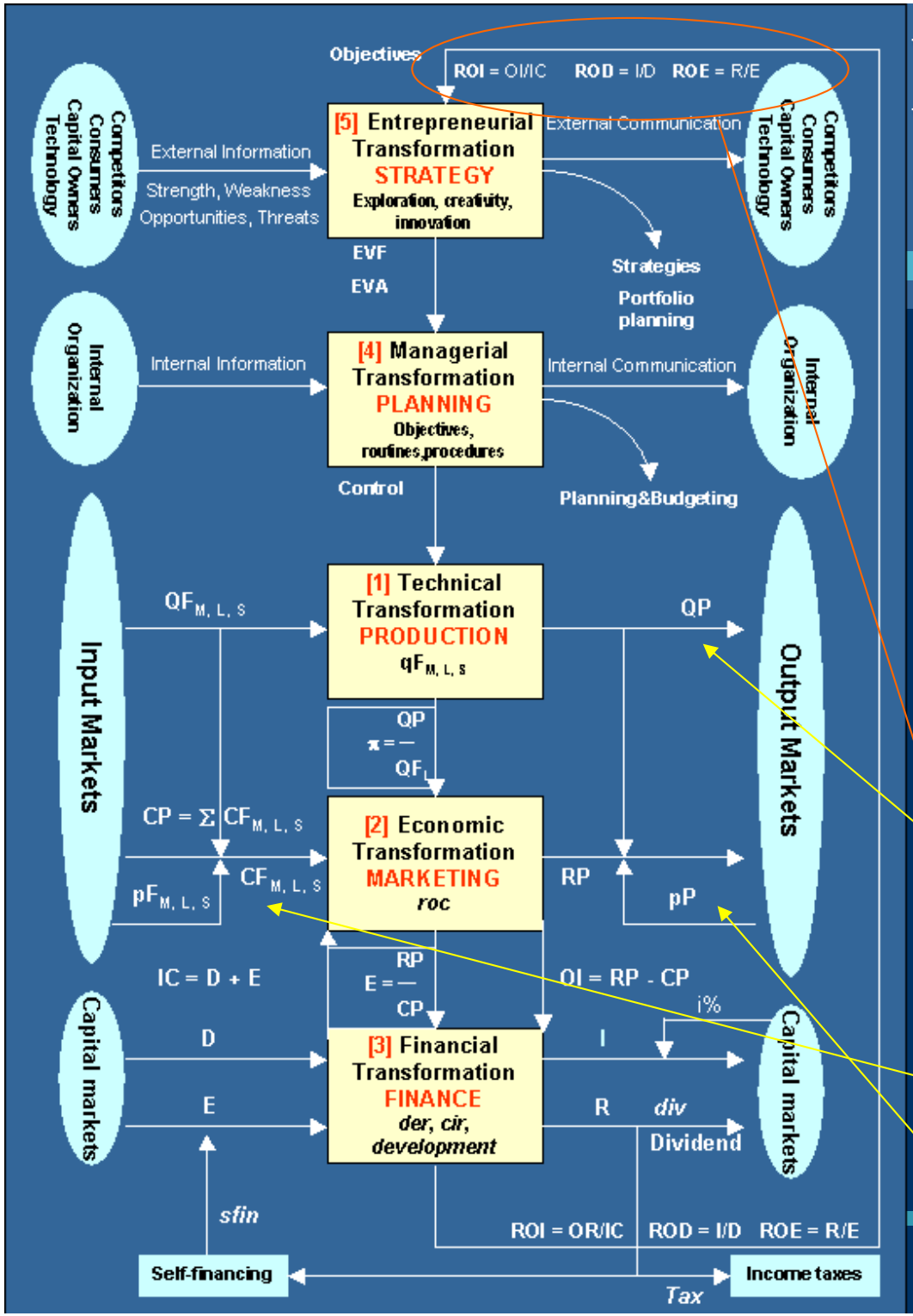
  ROE° = opportunity cost of capital for the shareholders

- *Economic Value Added*

  EVA **= IC (*roi* - *coi*)**

  coi **=** ***waac*** **=** *weighted average capital cost*

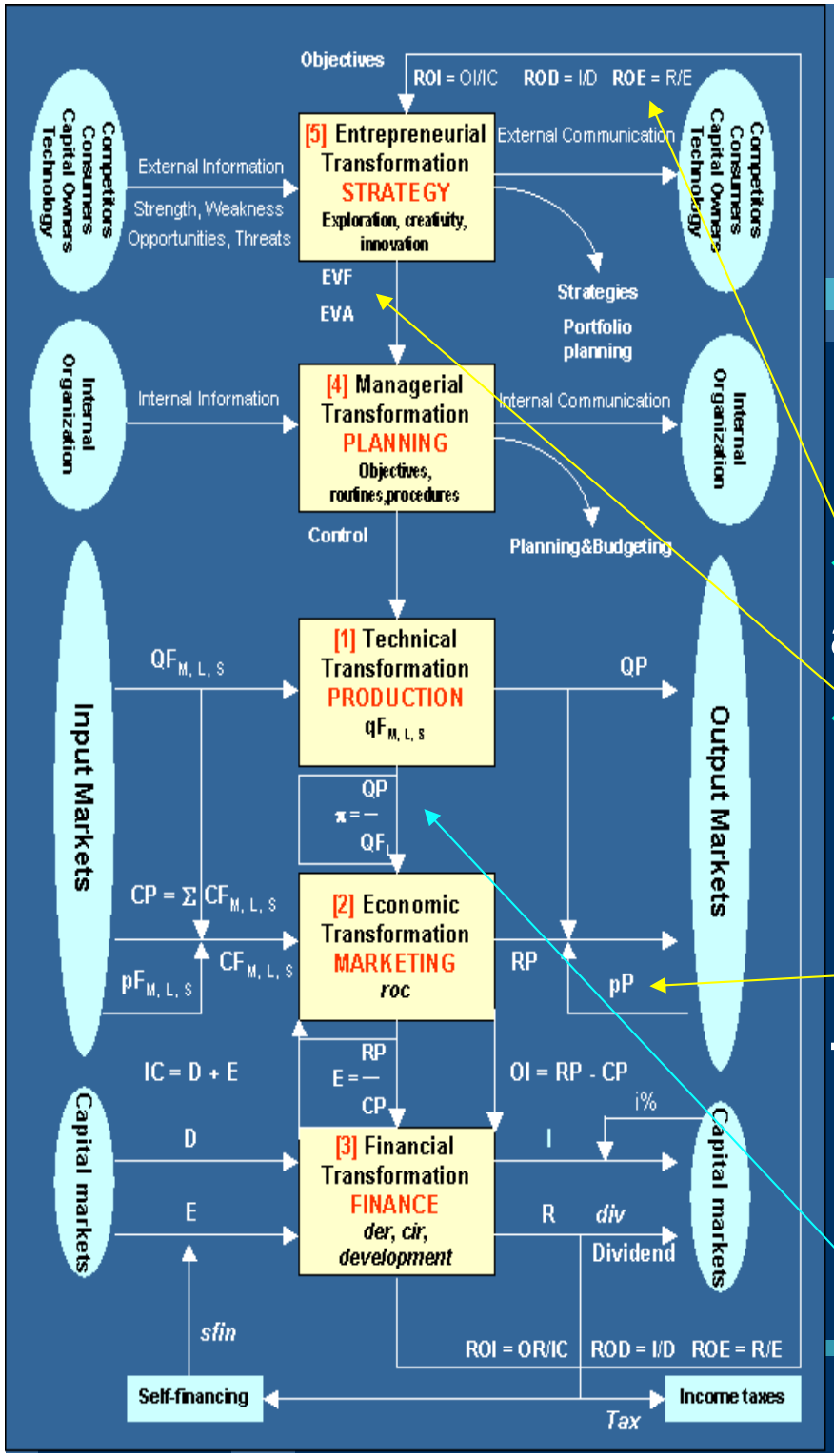
coi = [ROD × D + ROE° × E] / IC



Entrepreneurial Objectives

Proposition 1 - An economic condition for the existence of the *capitalistic firm*, which pursues **max *roe*** and **min *rod*** as defined in definition 4, is that it succeeds in producing an ***roi*** such that ***roi* > *coi***, and this implies that ***roe* > *roe*°** .

A high *roe* guarantees the production of value; since this depends on the *roi* as well as on the *der*, these become the *maximum management objectives* on which the other operating objectives depend: the *volume* of production and sales, *costs, quality,* and unit *prices*.



The crucial variable

Proposition 2 - In the capitalistic firm, a condition for success in pursuing:

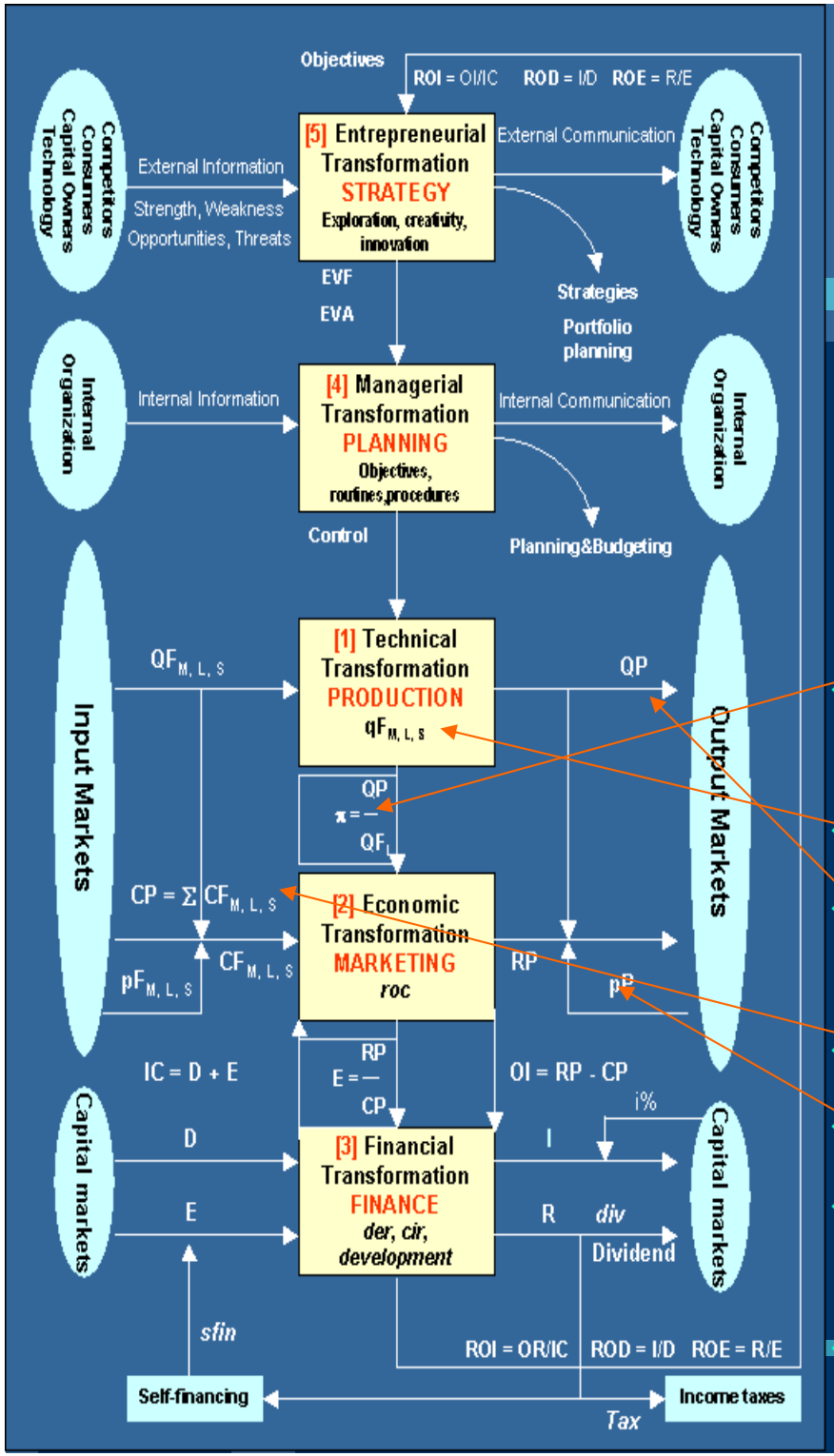
- **entrepreneurial objectives → max*ROE***

and

- **entrepreneurial performance → maxEVF** and **maxEVA**

  is the capability of the **managerial transformation** of pursuing **maxE(T).**

The existence of market risks makes the control of market prices too difficult so that the profit organizations must pursue maxE(T) through the search for max $\pi F_{M, L, S}$.



The Crucial Variable

Proposition 3 - The **Network of all capitalistic firms** is a system of **improvement and progress** where the following correlated trends occur:

- an increase in labour productivity πL = QP/QL
- a reduction in the labor requirement ($1/\pi L$)
- an increase in the quantity **QP** and quality θ of production
- a reduction in the **cP** = CP / QP
- a progressive reduction in **pP**
- an **increase in the wealth** of the entire economic system,
- with the constraint of **sustainability**.

Increasing productivity

Proposition 4 - I propose the following *Hypothesis of increasing productivity (and quality).*

The search for the highest levels of roe necessary to maximize EVF and EVA and meet the expectations of the firms' stakeholders gives rise to a system of improvement and progress whose macro effect is increasing levels of productivity (and quality) in order to maximize e(T) or OI(T).*

Productivity (and quality) represents the parameter of the *individual improvement* and *collective progress* of the combinatory system of firms.

The continuous reduction of labour requirements

- **Proposition 5** - **If $\pi L(T)$ increases over time, as a tendential phenomenon following the *Hypothesis* of increasing productivity, and if the increase in wealth is a factor indicating *progress* in the *system of consumers* the reduction in the quantity of work needed for production connot be stopped.**

- The proof can be found in the References. Nevertheless, it is evident, by observing the general ratio:

$$QL(T) = \frac{QP_{\theta}(T)}{\pi L(T)}$$

that if $\pi L(T)$ increases and $QP_{\theta}(T)$ is upper limited, by necessity $QL(T)$ must decrease.

References

- The complete model is very elaborate and detailed in its analytical aspects; the interested reader is invited to refer to the following texts:

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