TECHNOLOGY LIFE CYCLE AND ITS IMPACT ON RESEARCH & DEVELOPMENT COST & FINANCIAL FOR INDUSTRIAL PRODUCTS

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ABSTRACT

The Importance of this research is that it studies the effect of the relationship between the technology life cycle and the costs of research and development for the industrial product. The Problem Not knowing the impact of the relationship between the technology life cycle and the costs and Financial of research and development for the industrial product, as well as when those costs are recovered?; The Aim of this research is knowledge the impact of the relationship between the technology life cycle and the costs of research and development for the industrial product. The Hypothesis of this research is the costs of research and development are covered or refunded at the stage of technology ascendancy in relation to its life cycle. The Results of this research is the relationship between the technology life cycle and research and development costs is interrelated. Through research and development costs, we can design and develop an existing or discovered technology.

Keyword: Technology Life cycle, Financial, Cost of Research & Development, Industrial Products.

INTRODUCTION

In light of the difficult competition between countries and companies in a rapidly changing world, it has become imperative to focus on the research and development sector with the aim of reviewing and revising available designs and technologies, increasing the efficiency of production processes, improving existing products and creating new products in order to confront competitors and follow the continuous changes in the desires of customers Financial.

In addition to the scientific and technical importance of research and development activities, research and development activities from the economic point of view reflect the desire of the state or institution to give up part of its current revenues and profits in order to improve its efficiency and future revenues by employing part of the current revenues of the state or institution in research activities. The future pays off. And Technology is important because it is used in all areas of working life (OECD, 2021). When you reflect on your daily routine and count all the technology tools that you consume in just one day, you will realize how important technology is when you use the phone, watch TV, drive a car, and use a computer or any electrical machine financial cost. In fact, day after day, our dependence on technology increases, whether during communication, transportation, searching for any information, or even entertainment. Technology is defined in two ways: as *"the pursuit of life in ways different from life,"* and as *"structured inorganic matter."* Technologies struggles to survive evolve and enter life cycles its own, the life cycle is the various stages that a being goes through, from its production to its reproduction. As for technical research and

development, it is *"technical work that has been developed on a systematic basis to increase the stock of knowledge, including knowledge of man, society, this stock of knowledge to find new applications."* Firms spend their research and development costs in hopes of recouping the costs and getting profits Knows profit the net income after all expenses have been subtracted financial (Holm, 2019).

LITERATURE REVIEW

The Technology Life Cycle: The enterprise architecture is based on business gain with productivity, and the calculation of return through the concept of vital life financial. The technology life cycle is concerned with time, development costs, and the timeline for covering and recovering costs. It is also concerned with the ways in which technology can achieve profits commensurate with the costs and risk involved. The development of competitive production or processes can have a significant impact on the lifetime of a technology, making it shorter (Lin et al., 2021). The (technical life cycle) is associated with the production or technical service differently from the (product life cycle), but both are in agreement with (product life cycle management), and the latter is responsible for the product life in the market through financial commitment and respect for the timing of product introduction, marketing measures and business costs (Phan et al., 2019).

The four Stages of the Technology Life Cycle Tassey (2020):

Research and Development Stage (R&D): Research and Development (R&D), a phrase unheard of in the early 20th century, has since become a global word in industrialized nations. The concept of research is outdated, yet the concept of the relationship between research and development was not generally recognized until the 1950s.

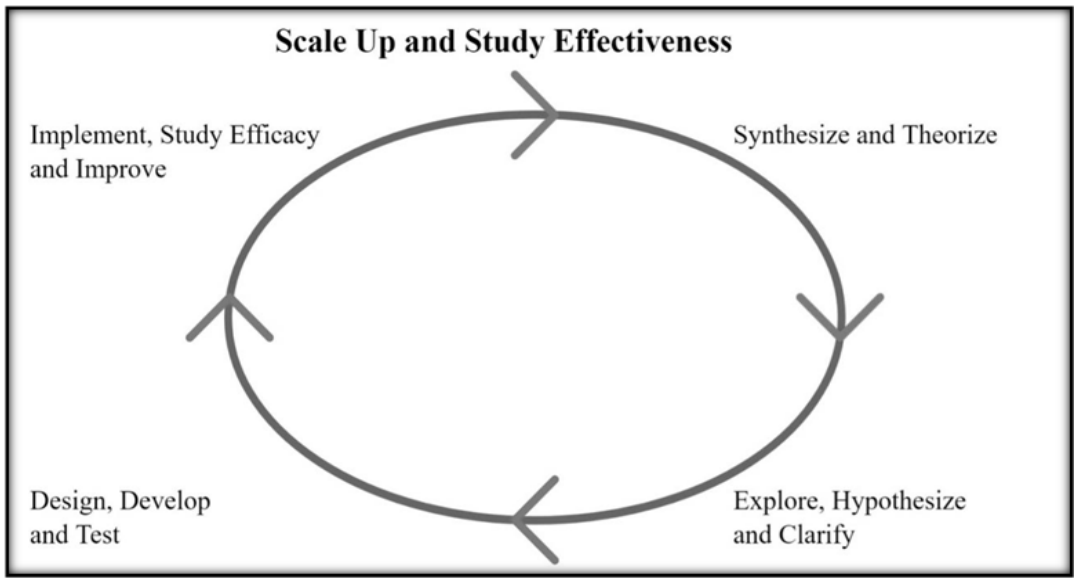
Research and development is the beginning of most industrial production systems, innovations that come out with new products usually have roots in research and have followed a path from an idea in the laboratory to experimental production or prototype and the start of manufacturing to the stage of full production and entering the market (Datar & Rajan et al., 2018).

The basis of any innovation is an invention, and in fact, innovation can be defined as the application of the invention to a large market need, and inventions come from careful, focused and sustainable research and investigation, and frequently trial and error. Research can be fundamental or applied, a distinction created in the first half of the twentieth century (Kennedy, 2019).

Basic research is defined as the work of scientists and others who pursue their research without conscious goals other than their desire to reveal the secrets of the universe. In modern programs of industrial research and development, basic research is not *"pure"* (sometimes called *"pure research"*); It is usually directed towards a general goal such as investigating the limits of technology that promises to address specific industry problems, an example of this being research that is conducted on gene splicing or cloning in pharmaceutical companies' laboratories (Kim & Lee, 2015).

Applied research transfers the results of basic research to a point where those results can be exploited to meet a specific need and increases in the research and development stage the necessary steps to bring out a new or modified product or process in commercial production. In Europe, the United States and Japan, the unified concept of research and development has been an integral part of economic planning either by the government or by private industry firms financial Management. And the R&D meaning Generating and experimenting with ideas related to new products, services, or processes. Sometimes called

"Edge haemorrhage" when the input is matched by the amount of the output and the result is negative, as the probability of failure is high Figure 1 and Table 1 (Charles et al., 2018).



Source: (Wood, 2019)

Figure 1
SHOW CYCLE OF RESEARCH AND DEVELOPMENT

Table 1
SHOW RESEARCH AND DEVELOPMENT STAGE CRITERIA (R&D) WOOD, 2019

Item	R&D	Criteria
1.	Basic R&D	Originally conducted, a theoretical or experimental R&D to obtain a new knowledge on the observable objects or the natural phenomena, without any purpose of a special application or industrialization
2.	Applied R&D	R&D initiative to obtain new scientific knowledge mainly with a practical purpose or goal, utilizing the knowledge given by basic R&D.
3.	Development R&D	A systematic research to substantially improve the products, which are already produced or set, or to produce a new product or equipment by utilizing the knowledge obtained from basic, applied R&D or actual experience.
4.	Other	Other R&D activities, which do not belong to any of the above categories

1. **Ascension Stage:** When the costs in kind are recovered, or as they are called (out-of-pocket costs), the technology begins to pool its forces through some excesses of the first stage of the technology's life cycle (sometimes called the *"leadership edge"*) (Ivan et al., 2015).
2. **Maturity Stage:** When profits are high and stable, the region tends to saturate.
3. **The Stage of Decline or (decay):** reduce the share and benefits of this technique (Haidar & Khalife, 2019).

RESEARCH METHODOLOGY

1. Research instrument: The author relied on the descriptive and deductive approach through a group of sources and research papers published in scientific journals related to the subject of the study and on articles, reports and studies published on the Internet, in addition to the author's reliance on descriptive and deductive description Scientific method Analytical approach. Studying the actual reality of data and information with a set of records and financial data of the department and a sample of the study and personal interviews with the relevant officials and adopting the inductive approach to reach the results using the ABC-M-based costing system Activities as a basis for calculating the costs of R&D in additional to standard Quality and then using the Technology Life Cycle Financial.
2. Research model: in this research we use tow linear models; One dependent variable and one independent variables in this model
3. Independent variables: Technology Life Cycle

4. Dependent variable: Cost of R&D
5. Descriptive analysis: The General Company for Electrical and Electronic Industries was established in 1973. It is a joint with Shareholder Company through the merger of several factories of similar activity, such as (the radio and television factory in the Light Industries Company, the Baqer Al-Baqer factory, and the Baqer Montazer factory). The company is still operating to this day Financial.

Table 2
SHOW THE GENERAL COMPANY FOR ELECTRICAL AND ELECTRONIC INDUSTRIES ACTIVITIES

Item	Productises Group	Engineering and Projects Group
1.	Home appliances production Radio Television Solar Heaters	Completion of projects Technology solutions. Maintenance and training Engineering projects Apps.
2.	Communication devices production Design and Installation of Communication systems and Networks, including Microwaves Telephones, Electronic Exchanges, digital Switches and Rural Exchanges	
3.	Production of parts and components Production of metal parts, containers and racks. Production of power and signal converters and coils Production of plastic parts and containers. Production of electronic cards (PCB electronic circuits)	
4.	Capacity and Renewable Energy Production of UPS Production of Power Supplies Production of Solar Heaters and Renewable Energy systems	
5.	Information Technology Production of pc, laptops, tablets and (mobiles). Various control and monitoring systems Business software and software on demand	

Note: Electronic Industries Corporation bulletins 2021.

From Table 2, we note that company has (Two Main Gropes) and several subsidiary activities branch out from it, one of these activities is the production of the sample TV (LED42).

Table 3
SHOW THE COST OF R&D FOR (LED 42) OF 2021; IQD

Item	Accounts	Cost per Item	Basic R&D 10 %	Applied R&D 15%	Development R&D 60%	Other R&D 15%
1	Stationary	36,612	3,661	5,492	21,967	5,492
2	Salaries	1,951,733	195,173	292,760	1,171,040	292,760
3	Energy (Petrol, Material, Electricity)	174,002	17,400	26,100	104,401	26,100
4	Employees Transfer	238,984	2,390	35,848	143,390	35,848
5	Training	695,000	69,500	104,250	417,000	104,250
6	Travelling and Expeditions	350,000	35,000	52,500	210,000	52,500
7	Internal Communications	16,000	1,600	2,400	9,600	2,400
Total Cost of 2021; IQD		3,462,331	324,724	519,350	2,077,398	519,350

Note: Electronic Industries Corporation bulletins 2021.

Through the previous Table 3, we note that the costs of R&D are distributed according to the proportions of the effort expended; In addition, the cost of development is the highest among the costs.

Table 4
SHOW TOTAL COSTS OF THE FINAL PRODUCT (LED 42) FOR 2021; IQD

Item	The Stages	Total Costs	[1]Stage to Total Cost Ratio
1	R&D Stage	3,462,331	1%
2	Designing Stage	481,480	0%
3	Production or (Operations) Stage	394,526,240	97%
4	Marketing & Distribution Stage	5,689,661	1%
5	Services beyond selling Stage	3,043,942	1%
Total Cost for (LED 42) of 2021; IQD		407,203,654	100%

Note: Electronic Industries Corporation bulletins 2021.

From the Table 4 above, we notice that the largest cost is the cost of production or processes (394,526,240) IQD with ratio 97%. And the Total Cost for (LED 42) of 2021; IQD (407,203,654).

Table 5
SHOW UNITS SOLD, COST PER UNIT &TOTAL COSTS OF THE TECHNOLOGY LIFE CYCLE

The Stages	Number of units Sold During the Stage (1)	[2]Cost per unit IQD (2)	Total Costs of units Sold 3=(1)*(2)
Ascension Stage	1-100	814,407	81,440,731
Maturity Stage	100-300	814,407	244,322,192
Stage of Decline	100-0	814,407	81,440,731
Total Cost of the Technology life Cycle	-	-	407,203,654

Note: Electronic Industries Corporation bulletins 2021.

From the previous Table 5, we note that 500 units were sold during the study period, and during the *Ascension* period, R&D Costs were covered which reached (3,462,331); as for the period of greatest demand for a product, it is the Maturity stage.

RESULTS AND DISCUSSION

Descriptive data analysis & findings: For all of the above, we note the huge cost of production or operations compared to the rest of the costs of the product, in additional to that represent (97%) for total cost financial management; and through a meeting with some engineers and technicians working on this product; it became clear that there are unnecessary activities that can be excluded, as follows:

Table 6
SHOW TOTAL COSTS OF PRODUCTION OR (OPERATIONS) STAGE FOR UNNECESSARY ACTIVITIES THAT CAN BE EXCLUDED

Item	Activities	Add Value Activities	Non- Add value Activities	The Different In Cost	Ratio of Reduce in Cost
1	Material	295,200,000	147,600,000	147,600,000	50%
2	Labour & wages	93,365,032	9,336,503	84,028,529	90%
3	Instruments & machines	810,109	405,055	405,054	50%
4	Stationary	17,383	17,383	0	0
5	Energy & fuel	836,733	836,733	0	0
6	Employees Transportation	2,531,146	1,265,573	1,265,573	50%
7	Travelling and Expedition	1,350,870	675,435	675,435	50%
8	Training and development	333,300	166,650	166,650	50%

[1] The cost of each stage divided by the total costs for 2021
[2] Represents the cost of one TV (total cost divided by the number of units produced)

9	Internal Communications	81,667	81,667	0	0
Total Cost of Production or (Operations) Stage		394,526,240	160,384,999	234,141,241	59%

Note: Prepared by the researcher based on the company's publications.

Through the previous Table 6, we note that unnecessary activities were excluded, and thus the cost of the product became as follows:

Table 7
SHOW TOTAL COSTS OF THE FINAL PRODUCT (LED 42) FOR 2021; IQD IF OMITTED SOME OF THE ACTIVITIES

Item	The Stages	Total Costs	Total Cost if omitted activates	Reduced the costs	Reduced of Ratio	[3]Cost per units
1	R&D Stage	3,462,331	3,462,331	3,462,331	0%	6,925
2	Designing Stage	481,480	481,480	481,480	0%	963
3	Production or (Operations) Stage	234,141,241	234,141,241	160,384,999	41%	320,770
4	Marketing & Distribution Stage	5,689,661	5,689,661	5,689,661	0%	11,379
5	Services beyond selling Stage	3,043,942	3,043,942	3,043,942	0%	6,088
Total Cost for (LED 42) of 2021; IQD		407,203,654	246,818,655	173,062,413	43%	346,125

Note: Prepared by the researcher based on the company's publications.

From Table 7, we note that unnecessary activities have been excluded, and thus the cost of the product has become (346,125) IQD instead of (814,407) That is, the rate of reduction is 43%.

CONCLUSION

The relationship between the technology life cycle and research and development costs is interrelated. Through research and development costs financial management, we can design and develop an existing or discovered technology. The costs of research and development are covered or refunded at the stage of technology ascendancy in relation to its life cycle. In the event that unnecessary activities are excluded, the cost financial of the product will be reduced by a percentage 43%.

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