

Increased Activities in Satellite Technology Ecosystems in Indonesia Affected by the Implementation of Strategic Changes and Internal Value

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Abstract — Change can be described in two ways, including planned or unplanned changes. Unplanned changes are changes that occur without preparation, on the other hand, planned changes are changes that were planned and thought out beforehand, occur for a long time, and include a clear purpose. This study is used to identify how changes in strategy have an impact on the formulation of the internal value to be built. This study takes a case from the National Institute of Aeronautics and Space in the process of implementing the strategy change from being a center of excellence to driving development sectors. The hope, of course, that this study can fill the literature gap and generate new knowledge on the implementation of strategic changes that have an impact on the internal value that is built. The methodology used in this study is an analytical method using literature studies as the main source. Literature studies conducted by: (1) understanding the concept of strategic changes and internal value, (2) knowing recent conditions at the National Institute of Aeronautics and Space Republic of Indonesia, and (3) evaluating the effect of strategic changes for the economic development in Indonesia. The study results explain that the change in strategy from a center of excellence to a driving force for the development sector has implications for the increasingly active technology ecosystem of satellite technology in Indonesia.

Keywords— Strategic Changes, Internal value, Study Literature, Technology Ecosystem

I. INTRODUCTION

Change can be described in several ways, including planned or unplanned changes. Unplanned changes are changes that occur without preparation, on the other hand, planned changes are changes that were planned and thought out beforehand, occur for a long time, and include a clear purpose. Planned change is easier to manage than changes that occur in human development or without the preparation of tools due to a threat. This opinion is supported by [2] explaining that there are changes in strategy that are incremental and big bang as seen from the speed of change (see table 1).

Table 1. Types of change

		Extent of change	
		Transformation	Realignment
Speed of change	Incremental	<i>Evolution</i> : Transformational change implemented gradually through interrelated initiatives; likely to be proactive change undertaken in anticipation of the need for future change	<i>Adaptation</i> : Change undertaken to realign the way in which the organisation operates, implemented in a series of steps
	Big bang	<i>Revolution</i> : Transformational change that occurs via simultaneous initiatives on many fronts; more likely to be forced and reactive because of the changing competitive conditions that the organisation is facing	<i>Reconstruction</i> : Change undertaken to realign the way in which the organisation operates, with many initiatives implemented simultaneously; often forced and reactive because of a changing competitive context

During its development, business entities (including government agencies) everywhere are very vulnerable to change. Business entities that are ready and able to respond to any changes are only included in the surviving category. Basically, a business entity's survivability from any changes becomes very elementary. Currently, business entities are required not only to survive, but also to be competitive in the midst of change, even though they are eratic. In response to this, business entities must view changes in the strategic environment to be something that is normal and certain to happen. Actually, strategic change occurs because the company aims to get absolute results from goals based on the existing vision because there are changes in the external and internal environment. In line with this [3,15] states that change consists of several stages, namely existence, survival, success, take off, and resource maturity.

The changes that occur have an impact on a paradigm shift in determining the strategic focus that will be carried out by the company. In responding to this, changes that have an impact on changing the focus of strategy must be based on strong internal values in the culture that is embedded in the company. A strong cultural system can anticipate changes in corporate strategy [18]. The problem that exists is that the values that exist in the company have not been formed or have been formed but have not been properly

used. The value creation process is a collective work that involves all elements of the company from top level management to low-level management and its implementers. Togetherness in the value formation process will increase self-engagement in each individual in the company. Another view of value creation, stated by Mekinnon, Gowland and Worzel [27], is a transformation of the results of creativity and innovation through discovery or development in producing products or services in a company. Kazanawa [27] defines value creation as a function of the ability to lead, get resources, and the ability to optimize the management process. In a very simple expression, value creation is referred to as an effort to build the value of a product so that it is useful and beneficial for the intended customer [14].

This study is used to identify how changes in strategy have an impact on the formulation of internal values to be built. This study takes the case of the National Institute of Aeronautics and Space in the process of implementing the strategy change from being a center of excellence to driving development sectors. The hope, of course, that this study can fill the literature gap and generate new knowledge on the implementation of strategic changes that have an impact on the internal values that are built.

II. RELATED WORK

2.1. Strategic Changes

Strategic change is defined as a concept measured in variable market conditions such as normal, volatile and crisis, through firm's 'business', 'corporate' and 'collective' strategies [1]. Strategic change is influenced by a number of factors, but the most frequent one is influenced by changes in organizational outcomes [21].

In ever-changing environments, strategic change manifests as a crucial concern for firms and is thus central to the fields of management and strategy [13]. Theory of Change can be traced to Peter Drucker's articulation of Management by Objectives, popularized in his 1954 book *The Practice of Management*. Management by Objectives requires identifying higher-order Goals, and lower-order objectives which, if achieved, are expected to result in the Goals being achieved. Theory of Change extends beyond goals (commonly named Outcomes in Theory of Change terminology) and Objectives to include Impact - the anticipated result of achieving stated goals [19]. A change in strategy can even have implications for the way companies handle projects. In his study, [17] explains that changing strategies can increase the level of success in a company.

The ultimate success of any Theory of Change lies in its ability to demonstrate progress on the achievement of outcomes. Evidence of success confirms the theory and indicates that the initiative is effective [4]. In accordance with the objectives of this study, an indicator that can be used is to increase activity in the research ecosystem. However, in its development, the implementation of

strategy changes is also heavily influenced by internal values, to be exact, the two variables influence each other to ensure success. At least these studies are described by [25,26].

2.2. Internal Value

Many studies on internal value have been carried out in previous studies [16,6]. The internal value could be multidimensional comprising both financial and non-financial values [6]. The internal value generated by intermediaries during collaborative projects will be multidimensional, comprising both (a) financial and (b) non-financial gains [10]. Value creation is vital for adoption of the architecture by third parties and customers [9]. Technology companies create substantial value when they are able to establish platform technologies that are broadly accepted.

Many studies can also explain internal value as a position that is influenced or influenced, especially in shaping ecosystems. However, it is quite interesting what was conveyed by [16] who explained that there is no direct evidence to suggest that shaping the ecosystem would help intermediaries to generate internal value through collaborative projects. A different opinion was conveyed by [6] where internal value can be formed due to interactions from clients. So that it deserves to be studied more deeply, related to the extent to which the impact is actually the effect between internal value and ecosystem improvement in this study.

2.3. Ecosystem

In his study, [11] explains that an important feature of an innovation ecosystem is that the resources available to the research economy are coupled to the resources generated by the commercial economy, usually as some fraction of the profits in the commercial economy. Another feature is that entities within the ecosystem are either geographically localized or strategically linked to focus on developing a specific technology. As a continuation, [11] also explained that ecosystems that find ways to translate knowledge of discoveries developed in the research community into a context that is relevant to the industry investors reduce the perceived risk for the investor so that he / she might be inclined to invest in the technology at an earlier stage. In another study, [24] also explained that in the perspective of the customer ecosystem, they explained that it is defined as systems of actors related to the customer that are relevant concerning a specific service. This includes service providers, other customers, and other actors not directly related to the service.

Another interesting study was also presented by [12] The Industrial Ecosystem analysis is based on the provocative ecosystem model calling attention on the basic conditions of natural recycling systems or roundput systems. In another context that is relevant in this study is related to the technology ecosystem. Various studies explain this, The concept of technological ecosystem appears when this set of tools and services are supported by an organization

in charge of ensuring a high integration degree and the successful evolution of their components [7]. The technological ecosystems as a solution to manage the knowledge inside organizations have increased during last years [8], the pattern has been used to define and develop the technological ecosystem to establish relationships and alliances between students, universities and companies or foundations . So it becomes very clear that the ideal ecosystem must involve many institutions to ensure a sense of ownership of the technological innovation products that will be produced together.

III. METHODOLOGY

The methodology used in this study is an analytical method using literature studies as the main source. Literature studies conducted by: (1) understanding the concept of strategic changes and internal value creating process, (2) knowing recent condition at National Institute of Aeronautics and Space Republic of Indonesia, and (3) evaluating the effect of strategic changes for the economic development in Indonesia.

IV. RESULTS AND DISCUSSION

In the 2015-2019 working period, Indonesia through LAPAN formulated a strategy that culminated in efforts to increase the mastery and independence of aviation and space science and technology, then in the next period, 2020-2024, in the form of increased use of aviation and space innovation products for national development. Emphasis in the 2015-2019 work period encourages LAPAN to increase the quantity obtained by its strategic work units to obtain the status of a Science and Technology Center of Excellence from the Ministry of Research and Technology, of course this is not an easy effort considering to achieve the status of center of excellence, the work unit must pursue the fulfillment of elements of the three components, namely sourcing capacity, research and development capacity, and disseminating capacity. The end of the work period shows the result that LAPAN, with 7 of its work units, has succeeded in achieving the status of center of excellence. The next step, after the success of obtaining this status, there will be a national movement to further increase the role of technology in the form of innovative products to drive the national economy. On the basis of this crucial reason, LAPAN has formulated a strategy that aims to drive the national development sector.

Changes or the nature of the increase in the level of the main strategies previously mentioned also have implications for the internal values that are built. In 2020-2024, LAPAN has set 5 internal values, including service user-oriented, accountable, innovative, integrity, and collaborative. Whereas in the previous period, internal value focused on learners, was rational, consistent, accountable, and oriented to public services. If viewed based on the determination of internal values that are used on several crucial notes, including: service orientation and

accountability are still used as internal values, this continues to be done and is considered reasonable because LAPAN is a public institution. Furthermore, the most significant thing that is stated in the difference in determining internal values between the two work periods is the inclusion of collaborative internal values which emphasizes the existence of serious efforts to build collective capacity among stakeholders. In the 2020-2024 working period, the element of collaboration has a significant impact to ensure the ultimate goal of the strategy in the form of driving the growth of the development sector is very crucial. This is in accordance with the philosophy of the meaning of collaboration stated in the planning document of LAPAN, namely Collaborative Internal Value which demands that ASN LAPAN must be able to build cooperation, both internally and externally. In its implementation, every ASN LAPAN must be able to work by prioritizing team work rather than individual work.

After the change in strategy and the process of creating internal value that has added value between periods, Indonesia has significantly shown an improvement in the research ecosystem. One of them is the ability of mapping national resources to contribute to each other in speeding up the achievement of national development targets, one of which is reflected in the low orbit communication constellation satellite project. This is certainly in accordance with the theory presented by [23] which explains that the demand for change in outcomes causes the internal strategy of the organization to change. Sure enough, the impact of the change in outcome has caused the national ecosystem, especially related to satellites, to have been mapped and began to show stretching developments, such as the active role of the private sector and the higher education sector to be more involved.

During 2016-2020, Indonesia has flown 6 satellites consisting of 2 experimental satellites and 4 communication operational satellites. This experimental satellite was developed by LAPAN, ORARI, and IPB in collaboration with TU Berlin (Germany). Meanwhile, the communication operational satellite is a satellite developed by BRI, PT TelkomSat, and PSN. In detail the development of satellites owned by Indonesia during 2016-2020 are as follows:

Satellite LAPAN A2

It is a micro satellite made in Indonesia which was built by LAPAN. The LAPAN-A2 satellite has three missions, namely earth observation, ship monitoring and amateur radio communication. The LAPAN-A2 satellite carries an Automatic Identification System (AIS) payload for identification of ships crossing satellite coverage areas, a digital earth observation camera with a 4 band multispectral scanning camera for earth monitoring, and an Automatic Packet Reporting System (APRS) which supports communications for disaster management. . This satellite was launched on 28 September 2015 in India. BRI-Sat satellite

The satellite owned by Bank Rakyat Indonesia (BRI), was created by SSL and launched by the Guyana Space Center. The satellite with a C-band Transponder of 36X36 MHz and a Ku-band of 9X72 MHz will orbit in the 150.5 East Longitude slot. The BRIsat satellite has 45 transponders using 23 transponders for BRI and four transponders for the government, namely the National Police, the Indonesian National Army Headquarters, the State Intelligence Agency, the Maritime Security Agency and the Ministry of Finance.

Satellite LAPAN A3

Developed in collaboration with LAPAN and the Bogor Agricultural Institute in order to improve the knowledge, skills, design and construction of satellites by the Indonesian nation in order to be able to master space technology, both for experimental and operational purposes. LAPAN is responsible for the design, design, production, testing, launching and receiving of satellite data. IPB is responsible for algorithm development, utilization and application of satellite data. Has missions of monitoring agricultural land, monitoring marine sector ships, and measuring the earth's magnetic field. The satellite was launched on June 22, 2016 and orbits at an altitude of 505 kilometers with an inclination of 98 deg, has TTC UHF, X-band data 105 Mbps, has a weight of 115 kg and dimensions of 667x574x930 mm.

Telkom 3S Satellite

Indonesia's geostationary communications satellite. Telkom-3S is equipped with 24 C-band transponders, 8 Extended C-band transponder links, and 10 Ku-band transponders. C-band transponders will cover Indonesia and Southeast Asia, C-band transponders will cover Indonesia and Malaysia. Meanwhile, the Ku-band content was devoted only to Indonesian coverage. Telkom-3S weighs about 3,500 kilograms and has an active period of 15 years. The manufacture of the Telkom-3S satellite is devoted to serving high-quality television broadcasts (High-Definition Television) and GSM and Internet communication services. The satellite was launched on February 15, 2017 using the Ariane 5 ECA VA-235 rocket from Kourou, French Guiana. The satellite orbits at 118 East

Red and White Satellite (Telkom satellite 4)

Launched August 4, 2018 at orbit 108 East. The Merah Putih satellite has a capacity of 60 active transponders consisting of 24 C-Band transponders and 12 Extended C-Band transponders which will serve Indonesia and Southeast Asia, while the other 24 C-Band transponders will reach the South Asia Region. This satellite relies on the SSL 1300 platform with a design age of 16 years. Development of the Red and White Satellite was carried out by Space System Loral (SSL as a satellite manufacturer and SpaceX as a satellite launch service provider company.

Nusantara Satu Satellite

Nusantara Satellite I (PSN IV) is an Indonesian geostationary satellite (GEO) owned by Pasifik Satelit Nusantara (PSN). This satellite is positioned above the

equator at 146 East and moves along with the rotation of the earth. This satellite is Indonesia's first broadband satellite to use High Throughput Satellite (HTS) technology with a larger bandwidth capacity to provide broadband access services throughout Indonesia. Has a capacity of 26 C-band transponders and 12 extended C-band transponders as well as 8 Ku-band spot beams with a total bandwidth capacity of 15 Gbps, with coverage throughout Indonesia. This satellite was built by Space System Loral (SSL), United States and launched at Cape Canaveral, United States in February 2019.

Furthermore, until 2024, Indonesia plans to orbit 3 types of satellites or 11 satellites (9 in constellation), namely the low orbit communication constellation satellite, the satellite internet satria belonging to PT satellite Nusantara Tiga, and the communication satellite owned by PT TelkomSAT to replace the PALAPA D satellite on orbit 113 East. The low-orbit communication constellation satellite design was carried out in a consortium by LAPAN, BPPT, LIPI, and industry, while the satria satellites would be built by France's Thales Alenia Space (TAS), while TelkomSAT satellites were currently in the international auction stage. In view of this, the low orbit communication constellation satellite design satellite (9 satellites) needs to be continued in the next working period to ensure the acceleration of information dissemination (5 minutes to 3 minutes) during the Tsunami disaster. The successful operation of the communication constellation satellite will have an impact on saving foreign exchange costs for satellite-based communications of up to USD 112 million per year and will grow the satellite-based disaster sensor industry in Indonesia independently. To ensure smooth operations, government agencies are also required to prepare supporting infrastructure [20]

V. CONCLUSION AND FUTURE SCOPE

Based on the results of tracing the literature and case studies in the field based on secondary data, there is a clear relationship between changes in strategy and internal value in an effort to increase ecosystem formation activities. This has been proven, particularly in relation to satellite technology research activities. This is shown by the increasing number of agencies involved nationally. For the next study, it is important to know the relationship between variables used in this study quantitatively.

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