



How Far Apart are Research and Industry in the context of Moral Synergy within Zimbabwe: Differential Views from Key Informants?

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ABSTRACT:

This paper shares differential perspectives between research and industry on the subject of synergy between them. The views were drawn from key informants (KIs) in both academia and industry. The Stage Gate process, Triple Helix, 3i Framework, Systems as well as the Business Ecosystem theories guided the analysis. Thematic contexts that guided analysis of findings were: infrastructure, technology status and access; culture, perception and attitude; skills/competence levels; governing statutes, policies and contents of strategic plans; resourcing (financial, human) access and priorities; exposure to best practices and then balancing institutions mode of operations, ideas and interests. The paper shares that interests between the two sides must be effectively negotiated if moral synergy is to be realized.

1. Introduction: Definitions:

Synergy –the interaction of elements that when combined produce a total effect that is greater than the sum of the individual elements, contributions (<https://www.dictionary.com>)

Moral synergy – refers to synergy that observes principles of right conduct or good cause (<https://www.dictionary.com>)

The issue of synergy between research and development (R&D) on one side and industry and commerce (I&C) on the other has been worrisome to key informants (KI) over time. As part of doctoral studies by the first author, KIs from either side were interviewed in years 2021 and part of 2022 in an attempt to compare perspectives from either side. This study period coincided with the outbreak of COVID19 whose mitigation required minimal person to person interviews. The questions were virtually administered to key informants in both academia and in industry through telephone conversations/interviews. Thematic issues that guided analysis (Phulkerd et al, 2022) included: ideas, interest and institutions (3i). The parameters selected in the analysis also included: markets, funding, infrastructure, access to state-of-the art technology, exposure to international best practices, policy and culture. The business culture dimension pursued sub-dimensions such as teamwork (Cooper 1994, 2014), the extent of business approach to research, acceptance of research commercialization by both academia and industry and the quest for rising above petty differences by KIs. The extent to which speedy facilitation of agreements occurred was covered. The transition in engagement beyond mere contacts into connections of value within organisation and across R and I were covered.

2. Analytical Framework:

The analytical framework drew from the following theories:

- Stage Gate Process (Cooper, 2011) which emphasises the market first; teamwork; novelty and excellent communication among other factors
- Triple Helix (Marina Ranga, Henry Etzkowitz (2013) which calls for a balance among Government, Academia and Industry
- 3i Framework (Phulkerd et al, 2022) which considers the Ideas, Interests and Institutions
- Systems Theory (Majchrzak Joanna, Golinski Marek, Mantura Wladyslaw, 2019); Chen Herbert (2014) which calls for a Holistic view and feedback
- Business Ecosystem (Galateanu-Avram and Avasilcai, 2013) which stresses interconnectedness, productivity gains and sustainability issues
- Policy mix for commercializing university technologies (QingQui Gan, Jin Hong, BoJunHou ; 2021) which calls for consideration on how researchers, technology transfer offices (TTOs) and private investors relate
- “Trinity” Analytical Framework (Zhang, 2017) which emphasizes the synergy among Institutes, Incubators and Industrial base

- National policies of the day, namely: National Development Strategy 1 (NDS1) 2021-2025; Industrial Development Strategy (2019-2023); University Innovation Hubs and several State Enterprise 5-Year Strategic plans (aligned to NDSI)

3. Analytical perspectives:

The main analytical thrust centred on identifying areas of positive convergence; areas of “negative” convergence as well as points of divergence between the two categories. This analysis helps in effective targeting of corrective interventions.

4. Coverage:

The KIs covered by the study were drawn from both industry and academia as shared by table 1 whilst table 2 shared some of the interviewees. Over 33 interviews were conducted for informants representing the R&D side and over 34 were from the I&C side. Only 50% from either side are highlighted in this paper.

Table 1: Organisations drawn from industry and academia

Industry	Research /Academia
Zimbabwe National Chamber of Commerce (ZNCC); Bankers Association of Zimbabwe (BAZ); Confederation of Zimbabwe Industries (CZI); Procurement Regulatory Authority of Zimbabwe (PRAZ); Senior Company Representatives for companies drawn from sub-sectors: foundry (metal casting), animal health products; fertilizer; pharmaceuticals; private laboratories; stock feeds; beverage manufacturers; information communication technologies (ICT); Seed Houses; Trade Measures Department and senior officers under the Ministry of Industry and Commerce (MinI&C)	Institute of Agricultural Engineering (IAE); Scientific and Industrial Research and Development Centre (SIRDC); Pig Industry Board (PIB); Tobacco Research Board (TRB); National Biotechnology Authority of Zimbabwe (NBAZ); Department of Research and Specialist Services (DR&SS) under the Ministry of Lands Agriculture Fisheries Water and Rural Development (MinLAFW&RD); University of Zimbabwe (UZ); Chinhoyi University of Technology (CUT); Harare Institute of Technology (HIT); Zimbabwe Council for Higher Education (ZIMCHE); Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development (Min HTE,I,STD), Ministry of Finance and Economic Development (MinFED)

Source: Key Informant Interviews (2021)

Table 2: Actual interviewees drawn from industry and academia

R&D/Academia	Industry & Commerce
<ul style="list-style-type: none"> • Chief Director-DR&SS • Executive Dean-Faculty of Agriculture and Food Systems-UZ • Zimbabwe Ezekiel Guti University (ZEGU) Vice Chancellor (VC), past Acting VC, past PVC-UZ, past SIRDC DG, Renowned Biochemist • past Chairman: School of Pharmacy-UZ; renowned researcher in pharmacology, toxicology and drug synthesis • Registrar & Director General-NBA(Z); renowned biotechnologist • Acting General Manager: TRB/Assistant General Manager Business Development • HIT PVC (Innovations & Business Development) • Current; Past Head-IAE • CUT VC, former Dean-Faculty of Engineering-UZ; renowned metallurgist • Director-ICT, ZIMCHE; formerly Director-Computer Centre-UZ • Head of Group on Pyro-Metallurgy (Mintek-RSA); formerly Director –Metallurgical Research Institute (MRI)-SIRDC • Chairman: Soil Science and Agricultural Engineering-UZ • Industrial Liaison Officer –Faculty of Engineering and Built Environment-UZ • CBI Head (DR&SS) • PIB Director 	<ul style="list-style-type: none"> • MD of an industrial chemicals manufacturing company; CZI Chair of Standing Committee on R&D • Past and current CZI Chief Economist • Industry captains (3) and past CZI presidents • ZNCC Chief Executive Officer • BAZ Chief Economist • Trade Measures Department –Chief Superintendent • General Manager of an animal health remedies manufacturing company • Director of Finance-Ministry of Industry and Commerce • MD of a Seed manufacturing company • MD of a regional seed house • Past and present ZISCO MD • MD of an electronics & electrical manufacturing company • MD of IPC Industrial Employment Agency • CEO of a local Asset Management Company • Executives (2) in Agricultural Finance Corporation (AFC) Bank • Renowned consultant metallurgist/Foundry expert

Source: Key Informant Interviews (2021)

5. Views from R&D:

A lead executive under the DR&SS expressed frustration “the Zimbabwe seed industry has roots in research but is no longer ploughing back into DR&SS for more research”. This showed that business under this sector are placing emphasis in their own interests which are in the form of profits and business growth. A Faculty liaison officer under UZ pointed out that “teamwork was lacking” and that “authorities under universities take a long time before signing collaborative agreements”. This, in a way, reduced the appetite for synergy. He also felt that “industrial R&D has been external in line with colonial era links” and that “local industry is yet to set-up own R&D capacity to shake-off colonial bondage”.

A professor in agriculture implored “the R&D work of university research fellows must be revived” as the “R&D output would feed into the newly created Innovation Hubs and Technology Parks”. A professor in pharmacology expressed the following reservations “our R&D work has produced more than twenty (20) pharmacology related products but was not sure how the Innovation Hub was going to absorb them”. They had developed special competency which was not automatically transferrable to university Innovation Hubs.

An ICT director formerly with a local state university shared that “university research boards are grossly under-funded” and also that the “majority university research fellow posts were vacant”. This adversely affected R-I synergy. A Pro-Vice Chancellor shared that “direct incentives to the inventor were key” and that “researcher capacity in terms of numbers, skill and access to modern equipment were very low”. This compromised output that could be transferred to industry with a synergistic effect.

A professor in medicine called for “innovation hubs that must produce tangible results including training kits in the field of medicine to minimize 100% reliance on imports”. Two experts in metallurgy and foundry raised concerns regarding “limited access to latest analytical and testing equipment as well as limited access to latest R&D tools of trade”. This heavily compromised what gets released for uptake by industry.

A director of an Innovation Hub and a Vice Chancellor of a state university shared that “the funding and equipment challenges must be addressed” and that “revive university research fellow –URF -positions must be revived”. These strengthened teaching and the R&D output “effectively fed into industry”.

A senior plant breeder and prominent biotechnologist called for the “revival of R-I and/or R-R collaborative work that used to be in place”. Cited past collaborative engagements include: DR&SS and Delta in sorghum breeding; DR&SS and Irvines’, National Foods in stock feeds and commented initiatives involving DR&SS and NBAZ on tissue culture work. Other synergistic collaborations were AFC-Dairy Industry revival and CBI contracts with seed houses on varietal exploitation under 3-5% commission on sales. A senior breeder under CIMMYT invited seed houses, agricultural colleges, university faculties of agriculture to “exploit varieties released by CIMMYT through free commercialization and raise own income”. The response to this call was very low, throttling R-I synergistic gains.

6. Views from I&C:

A prominent electronics engineer with more three decades of experience shared that “we must develop new product development (NPD) capacity and that the strategy for their exploitation must be right”. These two were observed to be missing. He also urged that “legal and technological capacity to protect and defend IP rights was also key”. Another marketing executive advised that “R&D units are important for new growth opportunities in industry” and “these must be set-up and be utilized to attain competitiveness”. Two senior engineers who served Managing Director of an iron and steel facility expressed that “I&C, like R&D face infrastructure challenges” as “laboratories were not adequately equipped and manned”. These conditions compromised the quest for R-I synergy.

Industrialists who served as past presidents of the CZI implored stakeholders, including academia to “aim for industrial excellence”. A renowned metallurgist and foundry expert shared that “gaps existed in NPD, mentorship capacity and access as well as utilization of modern R&D tools”. He also called for “culture change and shift away from bureaucracy and personality differences”. An industrial engineer serving as Managing Director of an oil expressing firm shared that “it was wrong to protect an inefficient industry”. Creativity and Innovations were to be pursued instead and implored Zimbabwe to “boost R&D in industry in order to attain competitiveness”.

A procurement executive under PRAZ shared that “there is special treatment by PRAZ when procuring R&D/scientific equipment” though procuring entities lacked awareness. A Managing Director of a seed company and two (2) AFC bank executives called for the “multiplier effect of technology” to be exploited with synergistic effect.

7. How far apart are R and I?

Convergence in the positive:

Research and Industry were positively converging on the following issues: Calling for technology upgrading; in urging the revive R&D units; the importance of protecting intellectual property (IP) and in calling for Culture change. The also agreed that Government had a role in mediation and mitigating the low synergy levels.

Convergence in the negative:

It was deduced that the two sides were unfortunately in the corner on undesirable dimensions such as: Lack of teamwork; Low mentorship capacity and Limited exposure to international best practices. Both had very low funding priority (R&D budgets under academia not funded; R&D Units shut down). There was low attention to prior art (literature; patent; industrial designs review) and there was limited direct incentives for creativity. Heavy “penalties or sanctions” for those that fail after trying meant very few would take the risk. In a way this also compromised the quest for R-I synergy!

Divergent:

Parties were divergent in ideas (and ideation modalities) and in interests. R&D Commercialisation through start-ups or Innovation Hubs or Technoparks were heavily resisted by industry. Industrialist “want to access technologies for free” and do not want universities to venture into their “industrial territory”. Universities expected funding from industry whilst captains of industry and banks considered “green field projects from research to be too risky”. Local industry was importing cheap good, put a mark-up and resale locally. A prominent human resources expressed concern about “replacement of manufacturing factories with warehouses full of imports”.

8. Context of Economic Development:

Convergence in the negative and divergent positions deprive the economy of new ideas and ultimately reduces speed of attaining competitiveness. The economy gets deprived of prospects of new jobs and new income streams. The quest for adding value to raw materials is also adversely affected. The burden on Treasury to pay for utilities and pursuit of competitive salaries/incentives for more R&D remains among state entities. Unlike international best practices, injection of novel products and services into industry remains restricted. Industry competitiveness remains suppressed and the ability to reinvest in R&D infrastructure remains a challenge. Attendance of technology expos for new ideas remains zero. Collectively industry and wider economic development remains suppressed.

9. Conclusion and way forward:

The KIs acknowledged that both academics and industrialist, though educated and tenured, have some aspect that need capacity building if R-I synergy is to be enhanced. These include working as teams (within and across); effective communication and sound attainment of economic competitiveness through local resources. A bankable business plan per project/idea was key for R-I connection. Though researcher incentives are needed, the researcher improve in “hustling for resources from allocative authorities such as National Treasury; Research Boards and Finance Departments”. It was shared that every semester universities collect fees- a share must be set aside for NPD which will generate more when commercialized. It was shared that the call for R-I synergy deals with resistance by educated persons. We ought to refer to international best practices and a Technology/Synergy Ombudsman, like in the USA, may be needed.

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