



Role of Leadership in Instituting Key Performance Indicators to Assess the Value of Research and Development on Commercial Agriculture

P.C. Abeysiriwardana^{1*}, and U.K. Jayasinghe-Mudalige²

¹Ministry of Education, Sri Lanka and Wayamba University of Sri Lanka, Sri Lanka

²Wayamba University of Sri Lanka, Sri Lanka

*Corresponding Author: abeysiriwardana@yahoo.com || 0000-0003-0300-2020

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Abstract- Having a set of Key Performance Indicators (KPIs) is now acknowledged as a promising tool that facilitates a decision-making process. Yet, the potential advantages associated with using KPIs are heavily contingent upon the trade-offs between the ‘financial’ and ‘non-financial’ measurements in use, especially in the case of performance management of research and development (R&D). Ambiguously defined KPIs in excess number may cause data in KPIs to overburden the entire decision-making process and discourage the entire organization structure from using it. On this understanding, this study aimed to scrutinize the practices of leaders in charge of performance management in leading research institutes working on commercial agriculture in Sri Lanka. A systematic process of reviewing the literature was carried out to identify, collate, and summarize performance management aspects on a global scale (Phase-I), followed by in-depth personnel interviews (n=32), aided by an interview guide comprised of 15 probing questions, with the leaders affiliated with research institutes (Phase II) to identify and compare such aspects in developing country context. The Thematic Qualitative Models produced by MAXQDA software were employed to assess those respondents’ perspectives. The results emphasized the organizational benefits arising from a well-planned performance management system (PMS) comprising sensible KPIs based on balanced measurements. The outputs from the analysis and the five themes generated by it further helped to synthesize a well-balanced set of Key Performance Drivers (KPDs). Software tools (eg: Code-Maps) were utilized to recognize the KPI-KPD relationships and highlight important aspects of leadership that were required in implementing data-driven PMS.

Keywords: Commercial Agriculture, Decision-Making, KPIs, Performance Management, Research & Development

I. INTRODUCTION

The agriculture sector in Sri Lanka contributes significantly over time to maintain the performance of its macro and micro economies by safeguarding the levels of food security, improving sustainable livelihood opportunities, and increasing the state of employability across numerous supply and value chains (DCS, 2020a, 2020b, 2022). It contributes by fulfilling the phenomenon of structural transformation, i.e. the ‘relative’ contribution of the sector to the overall economy decreases over time, but the ‘absolute’ contribution increases to which the level of productivity of and profitability from, agriculture production is of paramount importance. A high level of productivity can be a result of shifting to new and innovative technologies and/or significant changes to the levels of efficiencies in agricultural production processes, but those must be sensitive to the socio-environment (SE) challenges in place (Abeysiriwardana, Jayasinghe-Mudalige, & Seneviratne, 2022; Abeysiriwardana & Jayasinghe-Mudalige, 2022a, 2022c). Under these circumstances, institutional awareness of the aspects of SE and the social responsibility of research have been recognized as major factors in bringing up an “environmentally friendly” and “commercially viable” agriculture sector. Yet, it has been noted that those factors were not taken up in the lens of decision-making of a research institute, and they were not identified as Key Performance Drivers (KPD), measured properly, and then reported to the research management in time (Abeysiriwardana & Jayasinghe-Mudalige, 2022b). To satisfy these requirements, leadership should play a major role in designing, implementing, and monitoring performance management systems (PMS) in research institutes. As shown by Bass (1990) and Yukl (2002), literature reviews on leadership research frequently include a large number of studies and experiments. However, only a small portion of this literature has been studied in organizations related to research and

development (R&D) (Elkins & Keller, 2003; Gritzo, Fusfeld & Carpenter, 2017). This research gap is even widened when leadership qualities and attributes are sought in the successful implementation of performance measurements and the use of Key Performance Indicators (KPIs) in such systems for the management of R&D functions. On the justification that the KPI is a tool to evaluate KPDs (Abeywardana & Jayasinghe-Mudalige, 2021) and they should be well managed and looked after by a knowledge-intensive entity, this study shed light on how the leadership of R&D institute should be acted and behaved in integrating commercial and technological aspects along with SE aspects of research into one Performance Management System (PMS).

II. METHODOLOGY

In phase one of this research, a literature review was conducted to identify major performance drivers and relevant KPIs of the research institutes for monitoring and evaluating research innovations that contribute to the development of commercial agriculture (Abeywardana & Jayasinghe-Mudalige, 2022a). In phase two, on the understanding that there was little empirical research had been carried out to explore the potential relationships between the contribution of KPI connected with the key performance drives (KPD) and the research culture of a research institute with a particular focus on Sri Lankan context, semi-structured in-depth interviews were conducted. First, the 10 expert leaders were selected by the purposeful and snowball sampling method and contacted through the Online Video Conferencing facility. They were interviewed by an interview guide, which contained 15 questions with some probing questions on all aspects of KPI. The interview guide was validated by an expert panel. The attitudinal statements of interviewees were analyzed using thematic analysis (Braun & Clarke, 2006; Terry et al., 2017). The collected data were systematically analyzed by grouping them into codes, categories, sub-themes, and themes in a hierarchical order using MAXQDA 2022 software to find answers to the research questions formulated based on the research problems. To compare the results of the first analysis on 10 interviews with a whole population of 32 interviewees, the same analyzing procedure was carried out on all 32 perspectives of 32 interviewees.

III. RESULTS AND DISCUSSION

To assess the perspectives of the respondents, the Thematic Qualitative Models produced by MAXQDA 2022 software were employed, which resulted in five themes, including (1) Research Commercialization; (2) Research Collaboration; (3) Research for Society; (4) Institutional Management, and (5) Technology Integrated Systems. Overall, the results emphasized the organizational benefits arising from a well-planned PMS composed of sensible KPIs based on financial and non-financial measurements. However, the results of the analysis in the form of “Code system integration”,

“Code Map”, “Single-Case Model”, “Word Cloud” (Figure 01), etc. proved the leadership in those research institutes was quite aware of these KPIs in managing the agricultural performance management, but those KPIs were not practically and efficiently used by them to guide research development towards innovative commercial agriculture and to reflect the actual role of science and technology in the R&D process and knowledge creation.



Figure 01: Word Cloud of 32 interviews

The results of the Code Maps emphasized the necessity of maintaining a good association between “Research for Society” and “Research Commercialization” towards achieving sustainable agriculture goals that are supposed to contribute very much to achieving Sustainable Development Goal (SDG)-2. However, research institutes have not taken considerable effort to address the societal needs as well as commercialized requirements of the research business and its respective markets (Abeywardana, Jayasinghe-Mudalige, & Seneviratne, 2022; Abeywardana & Jayasinghe-Mudalige, 2022c). Therefore, it highlighted the importance of implementing policy directives to address these key themes highlighted by the experts in agricultural research institutes. All of these indicated that the institutes suffered a sufficient performance management system that enables data-driven decision-making based on such KPI data to monitor and manage research development towards innovative commercial agriculture. It further warranted that digitally enabled PMS that could integrate the whole research development process might provide a real-time decision-making system for research development (Abeywardana, Jayasinghe-Mudalige, & Kodituwakku, 2022; Abeywardana, Jayasinghe-Mudalige, Kodituwakku, et al., 2022). To allow the research institution to implement such an integrated PMS, the leadership of the research institute should focus on adopting new performance measurement frameworks and instituting certain policy directives and guidelines that take customers' and stakeholders' perspectives separately and strongly into account when developing PMSs.

To investigate more on qualities of leadership required in implementing and maintaining appropriate PMS, the theme “Institutional Management” was analyzed in detail, along with its subthemes, categories, and codes, as depicted in Table 01. For brevity, the table contains

the most highly referred 2 codes under each category. Themes, subthemes, and categories were not uniquely referred to by leaders, therefore, they bear the number zero.

Table 01: Details of subcomponents of the theme “Institutional Management”

Themes/ subthemes/ categories/codes	No. of codes
Total Codes 418	
Institutional Management	0
Role of Intercommunication	0
Barriers of Implementing	0
Inter Department Issues	7
Communication Gap	8
Decision Making	0
In Managing functions	21
Inter Connection between Divisions	33
KPIs in Decision Making	0
Performance Measurement	0
KPIs aligned to vision and mission	33
Performance Evaluation	34
Organization Management	0
Existing structure to manage performance	26
Dedicated entity to manage performance	41
Stability of Leadership	0
Agricultural policies	0
Stakeholders	1
Government policy changes	4
Focusing targets	0
Good leadership qualities	18
Maintenance of a good KPI System	17
Internal Environment	0
Fix KPIs	10
Changes in KPIs	19

According to Table 01, insights could be generated to outline the following leadership qualities that were sought to operationalize a good PMS in a research institute.

1. Leadership should always be on alert for Inter Department Issues concerning instituting KPIs
2. Leadership should be able to close “Communication Gaps” within different layers of the organization
3. Leadership should always maintain an “Inter Connection between Divisions”
4. Leadership should always set “KPIs aligned to vision and mission” and use those KPIs in the “Performance Evaluation” of R&D
5. Leadership should always consult a “Dedicated entity to manage performance” to avoid bias in decision-making on R&D performance
6. Leadership should always be on alert for “Changes in KPIs” and take action to “Fix KPIs” as required.

Therefore, it can be easily observed that “Effective leadership” is required for the “Maintenance of a good

KPI System”. Leadership should act as a focal point in building trust about KPIs among peers and subordinates. Furthermore, leaders should be equipped with technical skills as well as interpersonal skills that help sustain KPIs throughout their lifecycle in organization design. Technical skills specifically comprise digital skills enabling leaders to think, communicate, and make quality decisions about digital technologies and transformations in association with KPIs and PMSs. These skills will be more critical in maintaining a specified vision and mission through consistent KPIs to devise extended strategies in networks of R&D organizations and go beyond the goals of a single organization to tackle large-scale challenges such as food security and supply chain disruptions at sectoral and global levels.

IV. CONCLUSIONS

The outcomes of the analysis, in broad, indicate that the institutes under inspection suffer a good PMS to monitor and manage such aspects in commercial agriculture research that enables data-driven decision-making based on such KPI data. At the level of institutes, the leaders found it immensely challenging to lead the research community towards the success factor of ‘research for society’, where the environmental requirements associated with R&D play a key role. These highlight the importance of formulating a framework to establish a sound key PMS that guides the R&D process of a research institute along with a set of policy interventions to support innovative R&D in commercial agriculture. This warrants the policies, practices, and everyday behaviors of R&D leaders to be concentrated on establishing an environment in which the most effective R&D performance drivers such as commercialization and collaborations are induced and researchers can be most productive. All of these requirements highlight the importance of a leadership role in planning, designing, establishing, and maintaining good PMS that is operationalized through smart KPIs.

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