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**Analisis strategi bisnis produksi Radioisotop dalam menghadapi kemajuan Diagnosis pengobatan kanker
studi Pada pt kardia indonesia**
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ABSTRAK

Kemajuan Positron Emission Tomography-Computed Tomography (PET-CT) meningkatkan kebutuhan radiofarmaka Fluorodeoxyglucose berbasis Fluor-18 (FDG F-18) untuk diagnosis kanker. Namun, pasokan FDG di Indonesia masih terbatas, terkonsentrasi pada fasilitas tertentu, dan menghadapi kendala regulasi, logistik, serta ketersediaan sumber daya manusia. Penelitian ini bertujuan merumuskan strategi bisnis PT KI dalam memasuki industri produksi radioisotop melalui pembangunan fasilitas siklotron dan radiofarmaka FDG. Secara khusus, penelitian ini menganalisis daya tarik industri, kesiapan sumber daya internal, alternatif strategi, serta prioritas implementasi yang paling sesuai dengan profil risiko investasi dan regulasi.

Penelitian menggunakan pendekatan kualitatif dengan desain studi kasus. Data primer diperoleh melalui wawancara semi-terstruktur dan focus group discussion dengan manajemen PT KI, pengelola unit produksi radiofarmaka, pemegang saham, klinisi kedokteran nuklir, akademisi radiofarmasi, regulator, dan pemasok teknologi. Data sekunder meliputi dokumen regulasi BPOM dan BAPETEN, kebijakan Kementerian Kesehatan, laporan industri, studi kelayakan internal, serta publikasi ilmiah tentang model siklotron dan distribusi radioisotop. Analisis dilakukan melalui PESTEL, Porter Five Forces, value chain, SWOT, TOWS, dan QSPM.

Hasil penelitian menunjukkan bahwa industri radioisotop memiliki daya tarik pasar yang meningkat karena ekspansi layanan onkologi dan keterbatasan pasokan FDG. Akan tetapi, hambatan masuk tetap tinggi karena kebutuhan modal, fasilitas bunker dan hot cell, standar GMP radiofarmaka, perizinan BPOM-BAPETEN, serta logistik produk dengan waktu paruh pendek. Secara internal, PT KI memiliki kekuatan berupa jaringan rumah sakit, pengalaman layanan penyakit katastropik, dukungan investor, dan rencana pengembangan onkologi. Kelemahan utama berada pada kapabilitas operasional radiofarmaka, tata kelola risiko nuklir, dan ketergantungan pada transfer teknologi. Strategi yang direkomendasikan adalah focused differentiation melalui model hub cyclotron-spoke distribution, kemitraan dengan lembaga riset dan rumah sakit rujukan, serta pengembangan bertahap dari FDG ke tracer lain. Strategi ini perlu didukung oleh penguatan regulatory affairs, quality assurance, human capital, dan tata kelola logistik berbasis service level agreement.

Kata kunci: radioisotop, FDG, siklotron, PET-CT, strategi bisnis, value chain, focused differentiation, PT KI

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ABSTRACT

The advancement of Positron Emission Tomography-Computed Tomography (PET-CT) has increased the demand for Fluorine-18-based Fluorodeoxyglucose (FDG F-18) radiopharmaceuticals for cancer diagnosis. However, FDG supply in Indonesia remains limited, concentrated in selected facilities, and constrained by regulatory, logistics, and human resource challenges. This study aims to formulate PT Kardia Indonesia's business strategy for entering the radioisotope production industry through the development of a cyclotron and FDG radiopharmaceutical facility. Specifically, the study analyzes industry attractiveness, internal resource readiness, strategic alternatives, and implementation priorities that are aligned with investment and regulatory risks.

This research adopts a qualitative case study design. Primary data were collected through semi-structured interviews and focus group discussions with PT Kardia Indonesia management, radiopharmaceutical production executives, shareholders, nuclear medicine clinicians, radiopharmacy academics, regulators, and technology suppliers. Secondary data include BPOM and BAPETEN regulations, Ministry of Health policy documents, industry reports, internal feasibility studies, and academic publications on cyclotron business models and radioisotope distribution. The analysis employs PESTEL, Porter's Five Forces, value chain, SWOT, TOWS, and QSPM..

The findings indicate that the radioisotope industry offers growing market attractiveness due to the expansion of oncology services and limited FDG supply. Nevertheless, entry barriers remain high because of capital requirements, bunker and hot cell infrastructure, radiopharmaceutical GMP standards, BPOM-BAPETEN licensing, and logistics constraints related to short half-life products. Internally, PT Kardia Indonesia benefits from its hospital network, experience in catastrophic disease services, investor support, and oncology development plan. Its key weaknesses relate to radiopharmaceutical operating capability, nuclear risk governance, and dependence on technology transfer. The recommended strategy is focused differentiation through a hub cyclotron-spoke distribution model, partnerships with research institutions and cancer referral hospitals, and a phased product roadmap from FDG to other tracers. The strategy must be supported by stronger regulatory affairs, quality assurance, human capital, and SLA-based logistics governance.

Keywords: radioisotope, FDG, cyclotron, PET-CT, business strategy, value chain, focused differentiation, PT KI