9-2 Final Project: Information Technology Solutions Plan

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Information Technology Solutions Plan

Background

HYPERVSN is developing a fully immersive retail experience in which customers enter a room, are surrounded by holograms, interact with products through natural movement and voice commands, and can physically sense what they see, touching the texture of a shirt, for example, before deciding to buy it. Backed by a $2.5 million budget over five years, the company has already secured Euclideon as a spatial visualization partner but must identify a third collaborator with demonstrated haptic and sensory expertise to fill the one capability neither current partner possesses. That partner must align with HYPERVSN not only technologically but also culturally, in terms of IP ownership philosophy and shared market direction.

Schilling cautions, however, that before any partnership is formalized, HYPERVSN should do the internal groundwork first, specifically, defining exactly what kind of touch feedback the retail setting demands. That means researching which tactile qualities, whether roughness, temperature, elasticity, or simulated weight, actually drive purchasing decisions across different product types like clothing, furniture, and electronics. Doing this specification work upfront ensures HYPERVSN can evaluate potential partners against concrete criteria, negotiate from a position of clarity, and hold partners to measurable deliverables rather than selecting a technically impressive collaborator whose capabilities turn out to be misaligned with the real-world retail application.

Research and Critique:

Innovative Technologies

Innovation technologies include: Ultraleap (Bristol, UK), HaptX (San Luis Obispo, CA. USA), and bHaptics (Seoul, South Korea)

Ultraleap- they use sound waves to create a sensation of touch in mid-air. So, if a hologram of a silk shirt is floating in front of you, Ultraleap's technology can make your hand feel something smooth when you reach for it (Ultraleap n.d.).

HaptX- offers glove-based haptic feedback with extremely realistic texture simulation directly addressing the fabric-feel requirement. However, wearable equipment conflicts with HYPERVSN's no-wearables philosophy, so this would require negotiation around product scope (Use cases-robotics 2024).

bHaptics- provides full-body haptic suits and localized feedback systems (bHaptics Inc., 2026).

Assessment

Evaluating three haptic partners against HYPERVSN's budget and implementation needs, Ultraleap stands out for its commercially deployed technology and UK base, which aligns directly with HYPERVSN's London headquarters and reduces coordination overhead, though Euclideon would need to be looped into any testing results. HaptX offers enterprise-grade glove technology at $5,495 per pair (or $4,500 in a bundle), which remains feasible within the $2.5 million budget for R&D testing, and a side-by-side feature comparison with Ultraleap could help identify the stronger solution, though a $495 monthly subscription fee per glove adds long-term cost consideration.

bHaptics presents the most affordable option with its TactSuit Pro at $500 and TactGlove DK2 at $269 per pair, and while its consumer-grade origins in VR gaming make it a less obvious enterprise fit, its low price point could accelerate public adoption and, given bHaptics' presence in Spain and the Netherlands, Ultraleap could source the product with minimal friction. Across all three, Schilling's S-curve framework is relevant: haptic

feedback technology is currently transitioning from early development into a growth phase, meaning the technology is capable enough to deploy but not yet mature enough for a dominant design to have emerged giving HYPERVSN a strategic window to establish first-mover positioning in immersive retail before the competitive field consolidates.

Selection

The strongest candidate to complete the three-partner consortium is Ultraleap, a Bristol-based company whose UK presence makes operational collaboration with HYPERVSN's London headquarters significantly more straightforward than working across time zones with an overseas partner. Ultraleap's core technology combines mid-air ultrasonic haptics with precise hand-tracking, allowing customers to feel simulated textures and pressure on their bare hands without any glove or wearable device, a natural fit for HYPERVSN's vision of a seamless, hardware-free retail experience. Their Stratos platform delivers real-time focused haptic sensations while the Gemini hand-tracking software maps hand positions accurately in three-dimensional space.

Though current tactile fidelity is somewhat lower than glove-based alternatives, the technology is advancing rapidly and already has commercial deployments in retail, automotive, and entertainment settings, with a roadmap that aligns well with the five-year development window. Together, HYPERVSN, Euclideon, and Ultraleap form a consortium capable of addressing every stated requirement, spatial scale, visual immersion, motion conformance, voice command, and tactile feel within budget and with a phased roadmap that positions HYPERVSN for a defensible first-mover advantage at launch.

Adoption and Strategies Proposal:

Ideal Timing

Rogers's diffusion of innovations model categorizes adopters into five groups: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%)(Everett, 2003). HYPERVSN's five-year window spans the innovator-to-early-adopter phase of what will ultimately be a longer diffusion curve.

Three adoption timelines are worth considering. An accelerated timeline deploys a minimum viable suite by year two, maximizing early market presence but accepting significant technical risk, compressed development leaves little contingency if engineering setbacks arise. A conservative, back-loaded timeline defers public deployment until year four, reducing integration risk but sacrificing the innovator-phase opportunity and leaving minimal time to recoup the $2.5 million investment. The recommended approach is a phased five-year timeline: years one and two focus on R&D integration and prototyping, year three launches pilot deployments in two to four retail installations targeting innovators and visionary early adopters, and years four and five scale to broader early-adopter audiences based on real-world feedback.

This timeline best fits the organization for reasons that are inseparable from the six implementation variables identified. First, Rogers (Everett, 2003) identifies innovators as novelty-seeking and imperfection-tolerant, making them ideal year-three pilot partners whose feedback drives iterative refinement; however, reaching year three with a deployable system requires that technological integration complexity be resolved during years one and two, making that two-year R&D phase non-negotiable rather than merely conservative. Early adopters in years four and five, being more ROI-sensitive, will then have the case

studies and reliability data they require before committing. Second, Schilling (2022) warns that premature market entry can permanently damage a technology's reputation; regulatory compliance with acoustic radiation and CE[1] marking standards must therefore be achieved before any public-facing pilot, which is precisely why regulatory consultants must be engaged in year one rather than retrofitted into year three (Trade commissioner service 2025).

Third, structuring year three pilots as revenue-generating commercial licenses offsets ongoing development costs, but only if partner IP governance agreements are fully codified before R & D begins in year two, unresolved ownership disputes would stall the licensing model entirely. In this way, the five-year phasing is not arbitrary; each gate is positioned where it is because the variables governing integration complexity, regulatory readiness, and IP clarity demand it.

Variables

Six variables will shape the pace and success of adoption, each directly affecting a specific phase of the five-year timeline. Technological integration complexity is the primary driver of the two-year R&D phase. Unifying HYPERVSN's volumetric display, Euclideon's spatial mapping, and Ultraleap's ultrasonic haptics introduces latency, compatibility, and reliability challenges at every integration point. Schilling (2022) notes that systems integration is consistently underestimated as a source of delay; clearly defined performance benchmarks at each phase gate are essential to prevent slippage that would push the year-three pilot into year four and collapse the early-adopter window.

Regulatory compliance is a hard constraint on the year-three launch. Mid-air ultrasound must meet acoustic radiation safety standards, and CE marking and UK Health

and Safety regulations apply to both HYPERVSN's and Ultraleap's home markets. Because certification typically requires six to eighteen months, regulatory consultants must be engaged in year one not year two or compliance delays will push all public-facing phases back by a full year.

Partner IP governance must be resolved before co-development begins in year two. Ownership of jointly developed integration code, royalty structures, and dispute resolution mechanisms must be codified in year one, as Schilling (2022) observes that alliance failures stem more often from unresolved IP conflicts than technical shortcomings. Unresolved agreements would make the year-three licensing structure legally unenforceable.

Market education is built progressively into the timeline. Rogers (2003) identifies observability as a key diffusion driver, and the year-three pilots in two to four flagship installations are designed to generate the case studies and performance metrics that early-majority decision-makers in years four and five will require before committing. Competitive dynamics are most acute in years three through five, when HYPERVSN moves from internal development to public market presence. Microsoft, Meta, and well-funded spatial computing startups are all potential entrants, and a competitor achieving a dominant design before HYPERVSN's pilot phase concludes could permanently shift the landscape. Competitive intelligence should be treated as a standing function with formal reassessment at each annual phase gate.

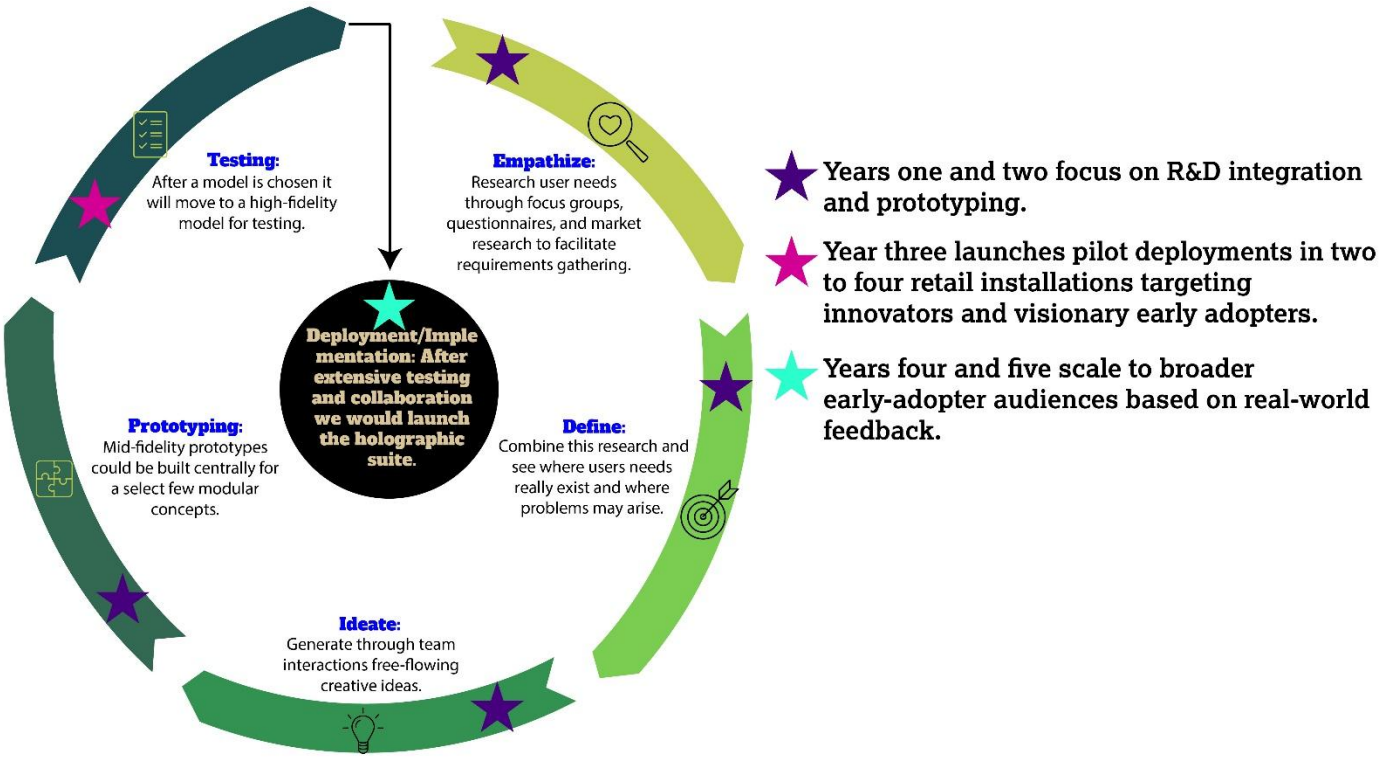
Macroeconomic[3] conditions pose the greatest timeline risk in years three and four, when the program transitions from budget draw to revenue dependency. To defend against

a retail spending downturn, year-three pilots should be distributed across multiple sectors ,retail, automotive, entertainment, and real estate, and the budget model should carry a 30 percent revenue stress scenario so that a shortfall triggers a pace adjustment rather than a program cancellation.

Implementation Process:

Plan

The new product development should follow a standardize design process:



Stakeholders

Successful integration across all five phases requires stakeholder engagement tailored to each stage. During the empathize phase, end users, retail shoppers, and store staff, alongside UX specialists and market researchers provide the behavioral and sensory

insights that shape system requirements. In the define and ideate phases, R&D teams from HYPERVSN, Euclideon, and Ultraleap are the critical stakeholders, as cross-consortium collaboration at this stage determines whether spatial, visual, and haptic subsystems are architected for compatibility from the outset. During prototyping, procurement leads, hardware suppliers, and IP legal counsel must be engaged to manage component constraints and ensure jointly developed code is governed by the year-one partnership agreements. The testing phase introduces independent safety evaluators and regulatory consultants to validate acoustic radiation and CE marking compliance; alongside demographically representative test subjects whose feedback generates the case studies early adopters will require (Keppe, 2026). Throughout all phases, C-suite executives oversee budget gates and strategic direction, while external stakeholders governing bodies, investors, and retail partners receive structured reporting at each annual phase gate to sustain confidence in the program and protect the year-three licensing model.

Ethical

Ethical compliance throughout HYPERVSN's implementation must be proactive and structurally enforced rather than reactively managed. The nature of the technology a fully immersive environment that responds to body movement, voice, and physical interaction means that ethical considerations are not peripheral to the system's design but are embedded in its most fundamental functions. Every design decision, from how data is collected to how the haptic system responds to human contact, carries an ethical dimension that must be deliberately addressed at each phase gate rather than deferred to legal review after the fact.

As the system collects biometric data including hand movements, voice commands, and behavioral patterns, GDPR compliance is non-negotiable. Customers entering a HYPERVSN installation must be fully informed of what data is being collected, for what purpose, and for how long it will be retained and that disclosure must be presented in plain language at the point of entry, not embedded in terms and conditions that no reasonable person cannot read. Consent must be freely given, specific, and revocable, meaning customers must be able to opt out of data collection without being denied access to the retail environment entirely. Internally, data minimization principles must govern system architecture from year one: the system should collect only what is operationally necessary, store it only as long as required, and delete it on a documented schedule. Data handling protocols must also extend to consortium partners, as any partner with access to collected data inherits the same compliance obligations and must be bound to them contractually.

The use of mid-air ultrasonic haptics additionally triggers duty of care[2] obligations, defined as the requirement that a person act toward others with the watchfulness, attention, caution, and prudence that a reasonable person in the same circumstances would exercise (Hill & Hill, n.d.). In practical terms, this means the consortium has both a legal and moral responsibility to ensure that prolonged or repeated exposure to ultrasonic frequencies does not cause harm to customers or staff. This obligation cannot be satisfied by assuming the technology is safe because it is commercially available, independent biomedical review must be commissioned during the year-one R&D phase to establish evidence-based exposure thresholds specific to the retail deployment context, where interactions may be longer and more frequent than in typical consumer applications. Those thresholds must then be built into the system's operating parameters as hard limits, not advisory guidelines,

and must be revisited as the technology scales in years four and five when cumulative exposure across larger audiences becomes a material consideration.

Accessibility compliance under the European Accessibility Act requires the system to accommodate users with mobility limitations, sensory impairments, and varying physical characteristics, ensuring the technology does not inadvertently exclude segments of the retail population it is designed to serve. A holographic retail environment that is physically or cognitively inaccessible to a meaningful portion of potential customers is not only an ethical failure but a commercial one, and accessibility requirements must therefore be treated as design specifications from the empathize phase onward rather than accommodations added during testing. This includes ensuring that voice command alternatives exist for users who cannot perform hand gestures, that the spatial layout of installations accommodates wheelchair users and those with limited mobility, and that the sensory intensity of the experience can be modulated for users with heightened sensitivity.

Any AI-driven personalization or behavioral analysis embedded in the system must additionally meet emerging algorithmic transparency standards across EU and UK frameworks. Algorithms that influence what products customers are shown, or how the environment responds to them must be auditable, free from discriminatory bias, and disclosed to users in a meaningful way. Bias audits should be conducted before any public-facing deployment and repeated annually as the system evolves. Finally, appointing a dedicated ethics compliance officer within the consortium in year one — with the authority to escalate concerns to the C-suite and halt phase gates pending resolution of outstanding

ethical gaps is the structural mechanism that ensures these commitments are enforced in practice rather than stated only on paper.

Legal

Legal compliance for HYPERVSN's immersive retail system operates across three interconnected domains: data protection, intellectual property, and product safety. Each imposes binding obligations that must be addressed by design rather than as an afterthought.

Data protection is the most immediate legal constraint. Governing frameworks in both EU and UK markets require a documented lawful basis for processing biometric and behavioral customer data, explicit user consent, and enforceable data subject rights including access, correction, and erasure. Because HYPERVSN operates across both markets independently, dual compliance must be maintained from the outset rather than treated as a single unified obligation. Privacy-by-design principles must be embedded into the system architecture from year one, not retrofitted during testing.

Intellectual property governance is equally critical given the consortium structure. Co-development between HYPERVSN, Euclideon, and Ultraleap will generate jointly created code, integration algorithms, and potentially patentable innovations. Without legally binding agreements specifying ownership allocation, royalty entitlements, and licensing rights, the year-three commercial licensing model has no enforceable foundation. These agreements must be executed before co-development begins in year two, as Schilling (2022) observes that IP disputes are among the most common causes of alliance failure.

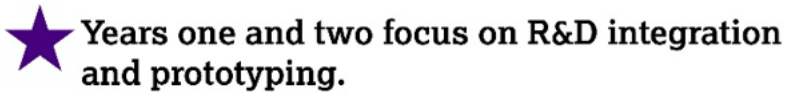
Product liability governs the physical deployment of the technology. Established consumer protection standards hold manufacturers and distributors responsible for harm caused by defective products, and mid-air ultrasonic haptics operating in a public retail environment falls squarely within this scope. Comprehensive liability clauses must be negotiated into all partner and retail installation contracts, and adequate product liability insurance must be secured before the year-three pilot launch.

Security

Legal compliance for HYPERVSN's immersive retail system operates across three interconnected domains: data protection, intellectual property, and product safety. Each imposes binding obligations that must be addressed by design rather than as an afterthought, and it is worth acknowledging that the boundary between legal, ethical, and security considerations is intentionally thin the policies governing data handling, consent, and IP protection serve simultaneously as legal requirements, ethical commitments, and security mechanisms.

Trade secret protection is a distinct and equally pressing concern throughout the earlier design phases, and one that is frequently underestimated in technology development programs where the urgency of building tends to overshadow the discipline of protecting. From the moment the consortium begins externalizing its concepts — whether through research activities, partner briefings, or supplier conversations — proprietary information enters environments that the consortium does not fully control, and the legal architecture

governing that exposure must be established before the first conversation takes place rather than constructed reactively after a breach has occurred.



During the empathize and define stages, stakeholders participating in focus groups, questionnaires, and market research activities will be exposed to unreleased concepts, novel functionalities, and proprietary system behaviors not yet available to the public. The immersive nature of HYPERVSN's retail environment means that even a high-level description of the system's capabilities — the combination of holographic display, spatial mapping, and mid-air haptic feedback — constitutes commercially sensitive information that competitors could act upon. All such participants must therefore execute non-disclosure agreements before engaging with any proprietary material, and those agreements must be drafted broadly enough to cover not only specific product details but also the underlying methodologies, integration approaches, and strategic intent the consortium is exploring. A narrowly drafted NDA that protects the product description but leaves the architecture and development roadmap unprotected provides far less security than it appears on paper.

The drafting and administration of these agreements must not be treated as a formality delegated to junior staff or handled through generic templates. Legal counsel with specific experience in technology IP and cross-jurisdictional enforcement must review all NDA instruments used across the consortium, given that participants may be located in different legal jurisdictions where enforceability standards vary. For participants based

outside the EU or UK, additional consideration must be given to whether the governing law clause and dispute resolution mechanism specified in the NDA is practically enforceable in the participant's home jurisdiction, as an agreement that cannot be enforced in the relevant court system offers only theoretical protection.

Beyond the agreements themselves, the consortium should implement a tiered information disclosure protocol that limits what any individual external participant is exposed to based on their specific role in the research process. A focus group participant evaluating tactile sensations does not need to understand the ultrasonic frequency architecture producing them, and a market research respondent assessing purchase intent does not need visibility into the spatial mapping integration. Compartmentalizing information by role reduces the aggregate exposure risk even when NDAs are in place, since the most effective trade secret protection combines contractual obligation with structural limitation of access.

Where the technology involves new processes or functionalities that may qualify for patent protection, legal counsel should assess patentability before any external exposure occurs, as premature disclosure can compromise patent rights in key markets. Many jurisdictions operate on an absolute novelty standard, meaning that any public disclosure of an invention — including disclosure to research participants, even under NDA — can invalidate a subsequent patent application if the disclosure is later deemed to constitute prior art. In practice, this means patent filings for core innovations should be initiated during the internal R&D phase, before the empathize and define research activities

introduce external participants into the development process. Provisional patent applications in particular offer a cost-effective mechanism for establishing a priority date early, preserving the consortium's rights while development continues and the full patent specification is prepared. Legal counsel should maintain a live IP register throughout the empathize and define phases, updated as new protectable innovations emerge from the research process, so that no patentable development goes unrecorded or unprotected simply because the team was focused on building rather than documenting.

Year three launches pilot deployments in two to four retail installations targeting innovators and visionary early adopters.

At this stage, NDAs must be executed not only by external test subjects but by every internal employee, contractor, and vendor with any proximity to the testing environment, regardless of their role or seniority. These agreements should be materially stronger than those used in the earlier research phases, explicitly addressing digital reproduction, photography, reverse engineering, and post-engagement disclosure windows that extend well beyond the testing period itself. Access to testing environments should be governed by need-to-know principles, with tiered clearance levels that limit exposure of the integrated system to only those whose participation is operationally essential. Test subjects drawn from retail demographics must additionally be briefed on the confidential nature of what they are experiencing, and their NDA obligations must be clearly explained rather than buried in boilerplate, both as a legal safeguard and as an ethical practice.

Simultaneously, any patentable innovations identified during prototyping that have not yet been filed must be registered before testing begins, as the introduction of external

participants — even under NDA — creates disclosure risk that can affect patent validity in certain jurisdictions. The convergence of a functioning high-fidelity product, external human participants, and multi-partner access makes the testing phase the single highest-risk point in the development lifecycle from an IP protection standpoint, and the legal framework surrounding it must reflect that reality.

Years four and five scale to broader early-adopter audiences based on real-world feedback.

Stakeholders at this stage would include the authors of the integrated software code and the inventors of the room's modular hardware components, whether those innovations were developed collaboratively across the consortium or by a single partner organization or one person. In either case, patent protection is non-negotiable — all patentable hardware elements must be registered and enforceable before public scaling begins, as broader market exposure at this stage significantly increases the risk of imitation and reverse engineering. Legal counsel should conduct a full IP audit at the transition from year three to year four to confirm that every protectable innovation is secured before the system reaches a wider audience.

At launch, a wholly proprietary model should be applied to maximize competitive defensibility. Through appropriability the consortium's ability to capture rents from its

innovation the holographic suite will be strategically diffused into the market with the intent of establishing it as the dominant design in immersive retail. Schilling (2022) identifies the dominant design phase as the point at which a technology's core architecture becomes the industry standard that competitors must conform to rather than displace. Achieving that position requires not only a technically superior product but also active market cultivation through retail partnerships, licensing structures, and continued observability — ensuring that HYPERVSN's installation becomes the reference point against which all competing immersive retail solutions are measured.

Conclusion

HYPERVSN's immersive retail vision is ambitious, but it is grounded in a clear-eyed understanding of what the technology requires, what the market demands, and what the five-year window realistically allows. The consortium of HYPERVSN, Euclideon, and Ultraleap brings together the spatial scale, visual immersion, and tactile feedback capabilities needed to deliver something the retail industry has never seen before.

Getting there, however, depends less on the technology itself and more on the discipline with which the organization executes — resolving IP agreements before co-development begins, engaging regulators before deadlines force the issue, and protecting every innovation before the market gets close enough to copy it. The legal, ethical, and security frameworks outlined in this plan are not constraints on innovation; they are the infrastructure that makes sustainable innovation possible. Done right, this is not just a

product launch — it is the establishment of a dominant design that competitors will spend years trying to catch up to.

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Endnotes:

[1]CE marking refers to Conformité Européenne (French for "European Conformity"). It is a certification mark required for products sold within the European Economic Area (EEA), indicating that a product meets EU safety, health, and environmental protection standards.

[2]A requirement that a person act toward others and the public with the watchfulness, attention, caution, and prudence that a reasonable person in the circumstances would use. If a person's actions do not meet this standard of care, then the acts are considered negligent, and any damages resulting may be claimed in a lawsuit for negligence.

[3]Macroeconomics is the study of entire economies, focusing on aggregate indicators like GDP, unemployment rates, and inflation to understand overall economic performance and growth. Its purpose is to analyze broad trends, such as business cycles, and guide government policy, including fiscal and monetary actions, to foster stability and growth.