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Applying MBIs for sustainable natural resource and environmental management in South Australia: Challenges and opportunities

Tian Shi *

Corporate Strategy and Policy, Primary Industries and Resources South Australia, GPO Box 1671, Adelaide, SA 5001, Australia

Abstract:

In the past decade, market based instruments (MBIs) have become more frequently applied for natural resource and environmental management purposes. MBIs comprise a range of instruments used to provide economic incentives/disincentives (e.g. by altering market prices, setting a cap or altering quantities of a particular good, improving the way a market works, or creating a market where no market currently exists) to economic agents to change their behaviour in an environmentally desirable manner. It is important to note that MBIs often rely on a regulatory framework and carefully designed policy instruments to operate effectively. MBIs must be tailored to local needs and conditions. Institutional capacity building and community participation are regarded as key components in this process. This paper outlines the challenges and opportunities for developing and implementing effective market-based mechanisms in South Australia. Particular interest are put on the institutional capacity building for MBIs adoption and implementation, and a decision framework for selecting appropriate instruments is also proposed.

Keywords:

MBIs, Natural resource management, Strategy, Policy, Implementation, South Australia

1. Why use MBIs?

MBIs are policy tools that attempt to influence behaviour by introducing new, or changing existing, market signals (Stavins, 2003). They seek to address the market failure either by incorporating the external cost of production or consumption activities through taxes or charges on processes or products, or by creating property rights and facilitating the establishment of a proxy market for the use of environmental services (Whitten et al., 2004).

Market failure in natural resource management (NRM) occurs when the market does not give appropriate signals to participants that ensure natural resources are managed sustainably. The primary causes of market failure include:

- **Externalities** – this occurs where firms or individuals do not bear all the costs and benefits of their action that affects other users. This can lead to one person not being compensated for the damaging actions of another. For example, the cost of treating saline water is borne by the end user rather than at the source of the salt;
- **Public goods** – is both non-rival (i.e., one person's use does not diminish another person's use) and non-exclusive (i.e., someone cannot be excluded from using it). For example, a lake may have significant environmental value, but individuals generally have little incentive to conserve it;

* Tel: +61 8 8226 0561; fax: +61 8 8226 0221; email address: tian.shi@state.sa.gov.au

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- ***Distorted markets*** – the operation of competitive markets may be inhibited by the abuse of market power (i.e., monopoly) on the part of an individual firm, industry group or sector. This situation will typically result in good or service being provided at a higher price and lower quantity (and/or lower quality) than would be the case under competitive market conditions. National Competition Policy implementation has a significant impact on this issue; and
- ***Asymmetric information*** – this occurs where there is a general lack of information or where information is restricted to one part of the market. This market failure has implications for the prices that consumers are willing to pay and for government policy setting. For example, it is very difficult for a government to determine the amount a landholder should be paid to undertake an activity because the cost to an individual landholder will vary significantly.

MBIs comprise a range of instruments used to provide economic incentives/disincentives to economic agents to change their behaviour in an environmentally desirable manner. The incentives are intended to encourage activities that lead to environmental quality, while the disincentives are aimed at discouraging activities deemed harmful to the environment. Rather than prescribing behaviour or use of a particular technology, MBIs allow more flexibility in the sustainable use and management of natural resources and environment. MBIs can achieve outcomes by altering market prices, setting a cap or altering quantities of a particular good, improving the way a market works, or creating a market where no market currently exists (Whitten et al., 2004).

Table 1. Instruments used for natural resource and environmental management

| <i>Instrument</i> | <i>Example</i> | <i>Feature</i> |
|-------------------|---|--|
| Market-based | Pricing for cost recovery of water service provision, consumption-based pricing, cost recovery for water resource planning and management, and pricing for externalities. Release of unallocated water using a tender scheme (eg, in Qld Burnett River). Temporary water trade in ameliorating the effects of recent drought conditions experienced in the MDB. Use markets to purchase water to meet environmental needs. | Influence behaviour by introducing new, or changing existing, market signals. |
| Regulatory-based | Ranges from licensing regimes for water access, water infrastructure and water use; environmental rules governing water extraction in catchments; rules for seasonal allocation of water; and trading rules within and between water systems. | Regulatory mechanisms rely heavily on the legislative and administrative architecture (which give them authority) and on the institutional arrangements (which give them effect on the ground). Many regulatory requirements – once established – rely heavily on self-regulation by users. |
| Planning-based | Water resource planning is the primary vehicle for describing the resource in a water system, and addressing the competing needs and values of water users (including the environment) in that water system. Governments develop statutory water plans as a means to assist governments and communities to determine water management and allocation decisions to meet productive, environmental and social objectives | Planning commits governments to use best available scientific knowledge, socio-economic analysis, and consultation with stakeholders in the development of water plans. Also help create a shared understanding of the resource, and greater acceptance of the management regime. |

Recently, NRM oriented MBIs have received increasing attention as they have the potential to deliver outcomes at a lower cost than many traditional government instruments. For example, evaluations of BushTender in Victoria indicate that the MBI approach preserved 25%¹ more vegetation than a grants scheme would have under the same budget. The use of MBIs shifts the strategy on environmental management from mitigation to prevention. It also gives the individual the choice to decide on how best to attain the environmental objectives by allowing the environmental costs to be reflected in the market prices (ABARE, 2001). MBIs are considered effective as they allow individuals as well as firms to voluntarily invest in shifting towards more efficient environmentally friendly means of production and/or waste reduction (Stavins, 2003). MBIs therefore are a promising new addition to the existing suite of natural resource and environmental management tools (see Table 1 for a description of complimentary and competing instruments). However, significant knowledge gaps and existing institutional impediments limit our ability to use them.

2. Applying MBIs in South Australia

South Australia is facing a range of complex NRM problems including water quality, salinity, biodiversity decline and soil erosion. As a result, South Australia is working toward a more strategic, integrated and effective approach to the management of its natural resources². Across the state, community-based Integrated Natural Resource Management (INRM) Groups have been established in eight regions across the State (i.e., Aboriginal Lands, Eyre Peninsula, Kangaroo Island, Mount Lofty Ranges and Greater Adelaide, SA's Murray-Darling Basin, Northern and Yorke Agricultural District, Rangelands and the South East).

Since mid-2001, the INRM Groups, in partnership with the federal and state governments, have developed INRM Plans, which are a detailed assessment of each region's biophysical assets, the threats they face and the actions needed to protect them. The plans identify the priority regional issues, clarify what has to be done and demonstrate the value of the investment required. Based on this information, the INRM Groups have worked with relevant agencies and organisations to design projects that will deliver priority NRM outcomes.

Governments, industry, communities and individuals invest significant levels of funding each year to address these NRM problems. To improve the efficiency and effectiveness of this expenditure a range of MBIs are currently being tested or implemented across South Australia. At the moment, there are three National MBIs Pilot Program projects in SA:

- **Catchment Care:** Developmening an auction process for biodiversity gains and water quality outcomes (Mt. Lofty-Kangaroo Island)
- Adoption of New Land Management Practices through **Conservation Insurance** (Lower Murray)
- **Cap and Trade to Salinity:** Property rights and private abatement activities – a laboratory experiment market (Lower Murray)

The current interest in MBIs stems from a concern that, in the future, sole reliance on traditional policy approaches, such as direct 'command and control' (CAC) regulation, education and suasion may be insufficient or high cost to achieve desired natural resource and environmental management outcomes. MBIs can complement these approaches by:

- allowing the flexible adoption of better NRM;
- encouraging innovation to achieve NRM outcomes;

¹ See <http://www.nrm.gov.au/publications/nrm-mbi/price.html>

² See <http://www.dwr.sa.gov.au/nrm/delivery>

- contributing to long-term and relatively self-sustaining solutions;
- leveraging private investment in NRM; and
- specially targeting market failure issues at hand;
- lessening likelihood of unintended consequences.

The application of MBIs depends on complex legislative and administrative arrangements and is constrained by specific institutional contexts (Convery, 1998). An important requirement is to better understand and account for implementation costs (including transaction and institutional costs). Another important experience is that while MBIs can lead to more efficient resource use or help recover costs, meeting environmental or social objectives requires other carefully designed policy instruments. MBIs are best used when there are many ways of solving a problem and significant differences in the cost (to individuals and the community) of these solutions. In these situations MBIs can reduce compliance costs by encouraging greater change by those for whom change is relatively cheap, rather than asking all participants to make the same level of change (Scott et al., 1995).

It is important to emphasise that MBIs often rely on a regulatory framework to operate effectively. For example, there are many opportunities for introducing tradable permits in SA; the major constraint to their implementation will be finding an equitable initial allocation and trading regime that is consistent with local market-reform processes.

3. Major challenges

3.1. Institutional sustainability

Institutional sustainability means for environmentally, economically and socially sustainable development to be achieved, institutions that promote these goals must themselves be sustainable (Brinkerhoff and Goldsmith, 1992). This is a worldwide situation, not just confined to the South Australian context. General roles and responsibilities might include implementation of economic incentives, preparation of environmental assessments, or initiation of public participation processes. However, in the inter-sectoral authorities, the degree of integration among the various agents is very low. Such arrangements have led to multiple instances of conflicting jurisdiction with existing agencies, and inconsistent norms and sanctions. In the decentralized authorities, regional agencies are responsible for applying state norms and for introducing appropriate regional adjustments. There is weak integration between state and regional levels. These intra- and intergovernmental integration issues are often identified as serious institutional problems (Huber et al., 1998).

MBIs are facing constraints by limited institutional capacity to implement them. As NRM and environmental issues became institutionalized (in some form) within multiple public sector ministries or departments, this could result in substantial duplication of effort and uncertainty in jurisdictions. A challenge has therefore involved a form of “rationalization” spelling out clear NRM and environmental policy objectives (Rodgers, 1991) and concomitant institutional reforms that involved more than one institution in the entire management process. In essence, the goal of rationalization and reform is to re-establish institutions that are themselves sustainable (OECD 1994).

The trend in Australia is toward consolidation of environmental management functions within a single body to minimize jurisdictional overlaps, to streamline operations, and to provide the ability to deal with environmental problems on a more decentralised basis. All of these moves are consistent with the ideas of institutional sustainability relating to cost minimization, priority setting, and flexibility. The two most significant constraints to implementing MBIs at a more

substantial level, however, are current lack of self-financing mechanisms, and lack of access to specialised resources (Scott et al., 1995).

3.2. Getting the mix of instruments right

The goal of NRM is to maximise the benefits through the efficient allocation of resources. In many cases free markets will achieve this goal. However, there may be other circumstances where markets fail to allocate resources efficiently. In this regard, a range of instruments is available to governments to achieve the objective of sustainable NRM, such as creation of property rights, provision of information, suasive measures, economic instruments (both price and quantity based instruments), and regulation. Determining an appropriate mix of policy instruments will be important tasks (e.g., how will MBIs fit with existing institutional and social structures, and complement or work against existing government policies and voluntary private sector activities).

A key issue is to establish a receptive or suitable environment in which MBIs can operate. The main challenge is to design MBIs that can be successfully applied within the context of the same institutional and political barriers that are constraining the CAC approach. The complementarity between regulations and incentives must be reflected in the design of all systems. For example, incentive charges may still be complemented with some baseline standard that must not be breached under any circumstances.

3.3. Overcoming impediments in implementation

Where property rights are ill-defined and institutional structural complexities exist, conflicts are more likely to occur when resource users pursue disparate management objectives. In this regard, when initiating a MBI program, legal and institutional setting must be considered where the regulations are also to be implemented. For example, the implementation of any trading program must not violate current water quality regulations. To be effective, MBIs should be compatible with existing or proposed legislation, institutional frameworks and administrative structures. In addition, jurisdictional constraints may affect the design and performance of MBIs. Particular difficulties may be experienced in coordinating instruments at different levels of governments. There may be inherent conflict between different interest groups, depending on the allocation of rights and responsibilities that different types of instruments bestow.

To achieve the goal of successful adoption and implementation of MBIs, it is important for the communities (industry, environmental groups, general community) to understand the functioning of instruments and the objectives. To overcome problems of acceptability, the environmentally beneficial effects of MBIs must be demonstrated through public consultation and information programs, and notion of fairness must be addressed as a prerequisite to any type of MBIs (Bari, 2002).

4. Potential opportunities

4.1. Building up institutional capacity

Environmental management demands strong governmental integration, public participation, and budgetary needs. A strong institutional base is a prerequisite to MBI implementation. At this stage, it requires to construct supporting institutions as a transitional system that takes account of existing capabilities and institutions. Huber et al. (1998) suggest that the chances of achieving long-term institutional sustainability increase if three conditions are met:

- Flexibility in institutional structures and mandates to deal with changing circumstances, which is best achieved by relying on existing capacity and mechanisms;

- Mechanisms should be available that provide for adequate financing of these institutions, which is best achieved through making the institutions cost-effective and providing with some form of long-term self-financing; and
- Initial development should focus on areas where early successes are likely to occur, which is achieved through phasing development of institutional capacity and outlining high-priority targets for intervention.

As a result, it is important to:

- Identify clear lines of responsibilities in the institutional framework to NRM (e.g., who does what, who pays for what, who monitors and evaluates);
- Examine the effect of different institutional arrangements on NRM; and
- Develop a common set of principles to help governments improve the institutional framework for NRM.

In the SA context, key elements may include:

- ***Research and propose quantitative targets and standards for NRM***, particularly for salinity and water quality;
- ***Capacity building for communities, landholders and government*** to develop and implement MBIs, together with the provision of technical and scientific support;
- ***An improved governance framework*** to secure the government investments and community participation in the long term;
- ***Clearly articulated processes and roles for government and the community*** in implementing MBI projects; and
- ***Establishing a public communication program*** with regional delivery bodies to support widespread understanding of all aspects of the MBIs policy to promote behavioural change and community support.

It is arguable that the National MBI Pilot Program has done MBIs a disservice by pushing too hard and too fast in regions that were institutionally unprepared to implement them. MBIs can be an important means for introducing added efficiency to existing CAC mechanisms. However, the scope of MBIs must match regions' institutional capacity to implement them. MBI approaches that introduce gradual and flexible reforms are therefore more likely to succeed within the current regional context of ongoing institutional changes (Convery, 1998). This does not mean that MBIs should be avoided, but rather that their successful use requires adequate legislation and financing, capable institutions, and effective monitoring and enforcement (Huber et al., 1998).

4.2. Designing MBIs compatible with existing institutions

A “weak” MBI essentially dictates through regulation the type of process that must be used; failure to comply results in economic sanctions. A “strong” MBI would allow market forces to determine the best way to meet a given standard or goal (Huber et al., 1998). A strong MBI thus decentralizes decision-making to a degree that the polluter or resource user has a maximum amount of flexibility to select the production or consumption option that minimizes the social cost of achieving a particular level of environmental quality. In the literature, MBIs are suggested to have lower compliance costs and can provide revenue for local governments. These factors have largely contributed to the early enthusiasm for using MBIs. In practice, however, the administrative demands of MBIs remain high. The monitoring requirements, legal design requirements, public consultation needs, and enforcement or collection systems related to MBIs are not always noticeably different from strict CAC approaches (Huber et al., 1998).

Policy makers must understand that the premises underpinning mature and established market arrangements may not be present in new and emerging markets, especially those involving complex natural systems (Haddad, 1996). It is clear that MBI initiatives are sought as complementary actions to CAC. The imposition of standards, licensing, zoning and permits still continues, and MBIs provide innovative and flexible ways to enforce them. This reinforces, however, the need to undertake more work on the relative impacts of different mechanisms. This effort may involve to:

- Take stock of existing instruments, including an assessment of their flexibility and the degree to which they help internalize environmental costs;
- Analyze existing legal mechanisms and their compatibility with MBIs; and
- Quantify the social benefits (e.g., environmental improvement, cost reduction) and costs (e.g., tax erosion, inflation) of the proposed reforms.

Figure 1. A decision framework for selecting appropriate instruments

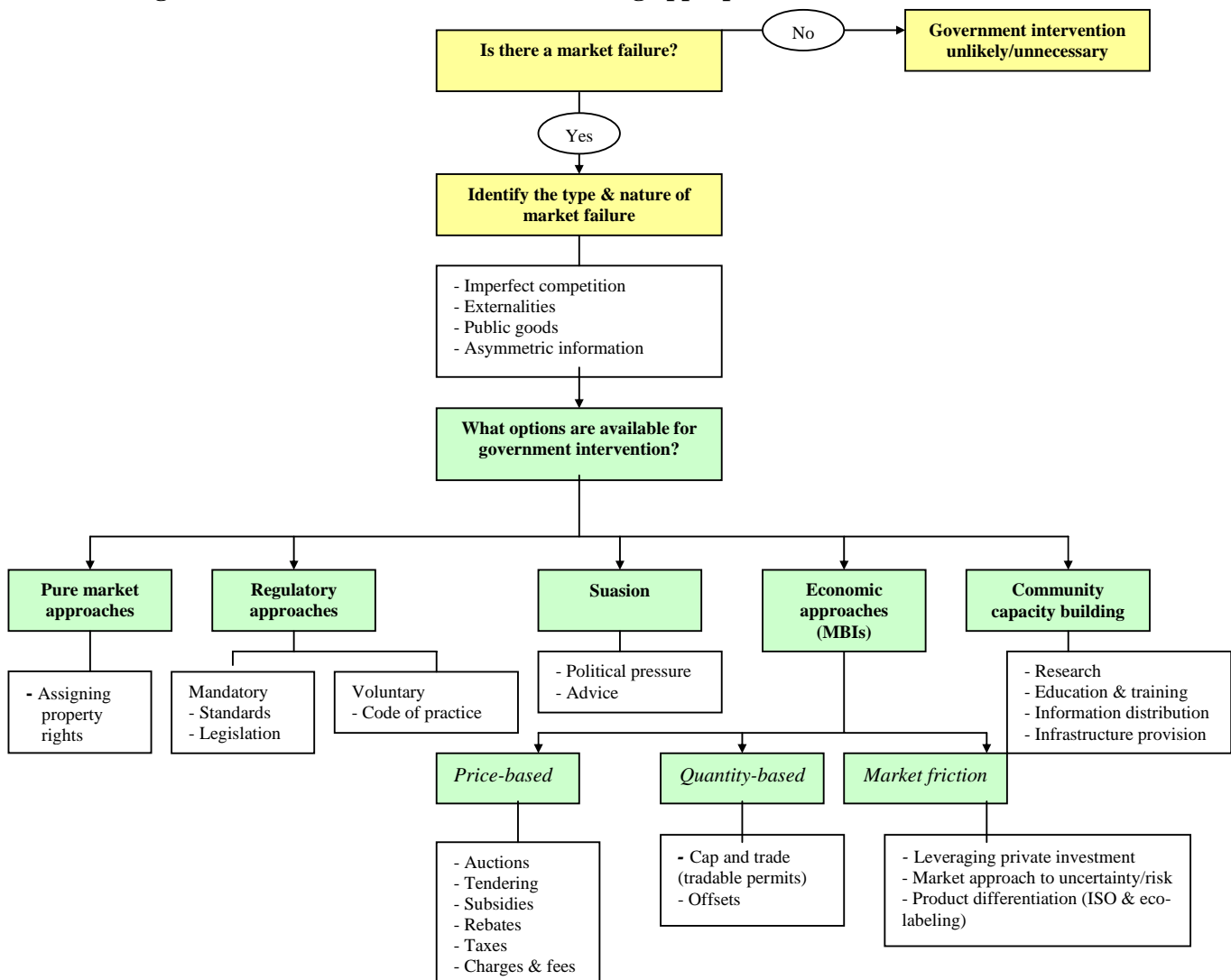


Table 2. Impediments when determining the potential use of MBIs

| <i>Impediment</i> | <i>Example</i> |
|------------------------------|---|
| Property rights | The absence of well defined property rights precludes market exchange Poorly defined property rights reduce market efficiency by creating: <ul style="list-style-type: none"> • uncertainty/unreliability in market outcomes • low market participation • high transaction costs (from potential litigation) |
| Thin markets | Insufficient buyers and sellers effects market efficiency by the processes of: <ul style="list-style-type: none"> • market dominance and concentration of permits (strategic rent seeking) individuals can readily influence market outcomes and reduce efficiency • permit hoarding (strategically impedes new entrants) A thin market reduces market efficiency by raising relative costs of transactions: fewer participants imply a lower probability of finding trading partners to resolve market demands |
| Knowledge/science | Lack of new knowledge on emerging issues, or knowledge is available but neither widely known nor sufficiently transferred to relevant parties Specific research issues that are crucial at a certain time to effectively support policy development are not well communicated to researchers Policy consideration of research results is not straightforward, mainly for political reasons A gap between the perspectives of policy formulators at the 'top' and the views held by policy takers at the 'bottom' |
| Monitoring/measuring | High costs of monitoring the compliance Difficult or unable to measure: suitable equipment or technology is not available |
| Efficiency | May not generate revenues for the government May not be economically efficient for implementers High initial cost may prevent implementation High administrative costs (ie, monitoring requirements, legal design requirements, public consultation needs and enforcement of collection needs) |
| Political will | Political support and adequate sustainable institutional arrangements may not be in place Turf protection or stick to 'business as usual' |
| Effectiveness | Project may not deliver results where they are needed Project may not deliver results in sufficient magnitude to achieve desired outcomes |
| Community structure/attitude | Community may have no interest in proposed project Community may lack the capacity to adopt cost-effective solutions Age/social structure of the community may limit ability to undertake desired actions Variation in community needs and conditions may limit implementation options |
| Institutional arrangements | Under-funding, inexperienced staff, unclear jurisdictions, lack of clear line of authority/responsibility Difficult to coordinate the necessary information flow and different views among agencies Difficult to integrate the latest research developments in legislation |
| Diversity/complexity | Hard to find a one-size-fits-all MBI, a mix of instruments may work better An 'optimal' standard may be difficult to set for some non-market environmental commodities |

4.3. Developing a decision framework to facilitate implementation

As Huber et al. (1998) suggest institutional capacity building and information-sharing are key factors that promote intra- and intergovernmental integration and public participation, thereby helping to remove legal and administrative barriers and merge institutional strengths. In this paper, a decision framework for selecting and assessing MBIs is proposed to help government to build up the capacity to facilitate the delivery of positive NRM outcomes (see Figure 1). In practice, there are a range of impediments that must be considered when determining the potential use of MBIs (see Table 2). Potential MBI use will require a capacity for informed decision-making about instrument options, priorities and trade-offs in the government departments.

Future work will look more closely at valuing the quantitative costs and benefits of various types of MBIs in different economic, administrative, and political contexts to provide clearer

guidance on which MBIs are most appropriate for specific conditions and policy objectives. In this context, the following six issues require attention:

- Focus on local region outcomes as more widespread experimentation with economic incentives can be riskier;
- Be realistic and implement policies and instruments within the existing institutional capacity;
- Avoid high transaction costs and MBI implementation should not outpace acceptance of market and community adjustments;
- Work with local government and agencies to ensure the integrity of the regional MBIs and government investments;
- Outline a timetable for the regional delivery body to implement MBIs and to periodically review and update them; and
- Reflect different circumstances in jurisdictions and the variation in the capacity and accommodate expectations and needs of different communities.

5. Concluding remarks

The potential opportunities outlined in this paper are intended to inform the agenda for policymakers. Future efforts that adapt to each region's specific needs are required. The most important lesson emerging from this study is that a more coherent approach to the use of economic instruments for natural resource and environmental management is needed and must clearly recognize and address the issue of institutional (un)sustainability. Weak participation among stakeholders poses a real constraint to the rapid implementation of complex MBI mechanisms.

While MBIs can improve natural resource and environmental management, in many cases they are not designed to replace existing CAC measures (e.g. environmental standards, licensing, zoning regulations, and permits), but rather to complement them and enhance their effectiveness. Sustainable institutional arrangements and capacity building are essential for MBIs to operate effectively.

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