Initial Post

One important reason behind the growth of agent-based systems (ABS) is the increasing need to model and manage complex situations in real life. Traditional systems often cannot deal well with unpredictable environments. ABS are very useful when organisations want to simulate how people, systems, and environments behave over time. This is especially helpful in areas like public health, emergency planning, or transportation, where real-world testing is difficult, risky, or expensive (Macal and North, 2010).

Besides simulations, ABS are now also used in real-time operations. For example, in smart manufacturing, agent-based systems manage machines, detect problems, and adjust production without needing instructions from a central controller. Each agent works on its own task but can still communicate and cooperate with others. This helps the system to keep working smoothly, even if one part fails or something unexpected happens (Leitão et al., 2016). It also makes it easier to scale up or change the system when needed.

Another strong benefit of ABS is their ability to show how simple local behaviours can lead to complex global outcomes. This feature is called emergence. In business, this helps decision-makers understand how different agents, like employees, customers, or suppliers, interact and affect each other. It becomes easier to plan strategies and improve processes by observing the system as a whole (Davidsson, Persson and Holmgren, 2007).

In conclusion, agent-based systems are becoming more popular not only because of artificial intelligence progress, but also because they give organisations better tools to plan, operate, and adapt in complex and changing environments. Their flexibility, decentralised design, and ability to simulate real-world conditions make them a valuable approach for many industries.

References:

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