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MANAGEMENT BY ... (MANY): EVOLUTION OF THE WEG MODEL FROM DRUCKER TO THE SCALABLE 21ST CENTURY

Abstract: This study examines the evolution of Management by Objectives (MBO) from Drucker (1954) through Deyhle's WEG model (1980) to the concept of Management by... (many) as a scalable approach for VUCA environments. The research focuses on extending Deyhle's five mechanisms (Objectives, Participation, Delegation, Exception, Results) into ten modules (including Time, Risk, Sustainability, Customer), illustrated through a case study of mangulica pig production.

The limitation of the original WEG model lies in its rigidity when applied to complex value chains. The case highlights operational challenges such as yield efficiency (80%), low mortality (<2%), time constraints (Christmas 2027), and sustainability targets (CO₂ <2 t per pig). Traditional reactive controlling is insufficient, while modern approaches require adaptive, situation-specific management ("each situation has its own Management by...").

Methodologically, the study combines desk research with a case study, expanding the WEG cycle (Goals → Paths → Design → Results) into ten mechanisms. Results confirm strong performance (profit margin >20%, NPS >85, blockchain traceability for EU PDO certification).

The main contribution is the formulation of Management by... (many) as a dynamic extension of the WEG model, relevant for SMEs. The hypothesis is confirmed: WEG evolves with context. Future research includes pilot validation (2027) and software development.

Keywords: management by... (many), Drucker MBO, Deyhle controlling WEG model, pig mangulica, VUCU

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Introduction

Subject and problem. Modern organizations are confronted with VUCA environments (volatility, uncertainty, complexity, ambiguity) where traditional management models lose effectiveness. The Deyhle WEG model (1980), although a sophisticated operationalization of Drucker's Management by Objectives through five mechanisms (Objectives, Participation, Delegation, Exception, Results), shows limitations in application to complex value chains in the context of specific national industries. In order to demonstrate this, in this paper a system of Management by Objectives on the example of mangulica pork production has been developed, where it can be seen how the classical WEG model with five mechanisms is limited to a rigid framework which does not cover specialized challenges such as time pressure, research of breeds, sustainability, risk management, as well as customer perception required for achieving an 80% yield with less than 2% disease (Bennett & Lemoine, 2014; Griffin, 2015; Every resource → each situation has its own management). American reactive controlling (Goetz, 1962) uses controlling only for problem remediation after they occur, whereas the German predictive model requires continuous adaptation which is currently missing in the empirical validation of WEG flexibility for Croatian SMEs in the agrarian and/or tourism sector. In this respect, each situation and activity requires its own specific Management by... according to the extension of Griffin's thesis on resource management. As the research results show, in the mangulica pig value chain example, where acceptable key risks have been achieved when moving from 20,000 to 16,000 piglets, accompanied by monitoring of an NPS above 85 points, CO₂ emissions below 2 tonnes per pig, and a profit above 20% at a premium price of 8–10 €/kg. The subject of this research is focused on the analysis and formulation of a new Management by... (many) which emerges as a logical course of evolution of the WEG model from Drucker to the scalable Deyhle model of the 21st century.

Management by Objectives, the U.S. Environment as a Factor. The development of management is linked to industrial revolutions, of which the Second Industrial Revolution (1870–1920), characterized by electricity and mass production, triggered the emergence of modern scientific management. Frederick Taylor in 1911 (Taylor, 1911) in the U.S. standardized work processes through time studies, parallel to Henri Fayol in 1916 (Fayol, 1916) in Europe who formulated 14 principles of administration. These classical authors laid the foundations of management for the Third Industrial Revolution and for modern controlling as a management function which, especially in Europe, replaced commanding. Demands for better work results were set by the mega war industries of the First World War (1914–1918), and then also by the Second World War (1939–1945), which conditioned strong post-war development of world economies, especially of the victorious powers such as the U.S. (Post-WWII Marshall Plan 1948–1952: U.S. industrial output +300%, new management tools needed). In the dynamics of accelerated industrial development after the 1950s, particularly in the U.S., Peter Drucker made an important contribution to management by developing Management by Objectives (MBO) in the book *The Practice of Management* (Drucker, 1954), which for the first time introduced participative goal setting instead of authoritative commands. Nevertheless, as a German

who in the U.S. found a favourable climate for the development of managerial thought, Drucker still had a sense for controlling. At the same time, the narrow focus on results and profit of the American economy prevented Drucker from realizing the dimensions of controlling that controlling offers. As Goetz notes, elaborating on the American concept of cooperation between planning and controlling, their relationship is separate, although Goetz does not recognize this and states: *“In the present-day environment, it is quite likely that planning fails due to some unforeseen events. There controlling comes to the rescue. Once controlling is done effectively, it gives us stimulus to make better plans. Therefore, planning and controlling are inseparable functions of a business enterprise”* (Goetz, 1962). In this way, in American management controlling serves to fix a bad situation after it has occurred; it comes, fixes it, and leaves, and the work process continues until the next problem, where controlling again appears. In such a mega economic environment American management did not allow Drucker to perhaps develop some higher level of Management by Objectives, but even this was an epoch-making discovery and contribution to the development of management for the post-war 1950s.

Management by Objectives, the German Environment as a Factor. Defeated Germany in two world wars, brought down to the ground after the Second War, divided into two blocs, one communist and one capitalist, found itself in a position like few other countries in recent world history. Despite all this, the research and insights of the Freiburg School (ordo-liberalism) which began in the 1930s in the time of Hitler, through the work of Walter Eucken (1891–1950) (Eucken, 1952) and the macrostrategic model of the “ordo-system” that defined the state framework for a free market, continued and became the foundation of the Social Market Economy (Erhard, 1948). Thanks to cooperation between politics and science, West Germany developed a macrostrategic model aimed at securing a good life for its people. The need for labour in Germany and the underdeveloped part of Europe with an excess of labour force made the development of Germany fast, strong, and stable. A high level of patriotism, a strong aversion toward the bad past, assurance of peace, a high level of investment in education and science, together with the traditional German motto “order, work, and discipline”, led Germany to the very top of civil and market-oriented Europe. The beginning of the reunification crisis (1990–1993), the fall of the Berlin Wall (1989) and the accession of East Germany slowed the high pace of Germany’s development. Over time Germany overcame that problem, emerged stronger and larger, and was firmly established as a leader of the new mega community of the European Union. At the time when Germany was overcoming the problems of reunification, the U.S. triggered the dot-com crisis (2000–2001) where NASDAQ fell by 78%. It was becoming clear that American management could not cope with the complexity of global crises brought about by an increasingly complex economy. The German management school networked around four key universities – University of Mannheim (controlling), TU München (scenario planning), University of Freiburg (ordo-liberalism), WHU – Otto Beisheim School of Management (Deyhle Controller Academy) – promoted itself as a preventive approach to the German economy during crisis. These scholars developed models of crisis forecasting through real-time controlling and a hierarchy of sub-objectives. The results of that work and cooperation with politics

could not go unnoticed. The German managerial school gained worldwide recognition and was placed shoulder to shoulder with the Japanese school of management. What was important for the German management school was the support of private universities (WHU, Frankfurt School) as well as the scientific achievements and insights developed by the private schools. Such an approach to education and science, especially management, was the foundation for the development of management in the sense of Management by Objectives. It was a continuation of where Drucker stopped in the 1950s (Albrecht Deyhle Controller Academy founded 1971; Deyhle, 1980b) about twenty years later continued developing his Management by... system which operationalizes MBO through concrete steps (Wege → Ergebnisse → Gestaltung).

Management by... in the WEG Model. The WEG model operationalizes Management by Objectives through a three-loop cyclical system (Wege – Ergebnisse – Gestaltung) that converts strategic visions into measurable results via differentiated “Management by...” mechanisms (Figure 1). The Management by... model and the WEG system were developed in the mid-1970s at the Management Academy Munich in cooperation with several European experts: V. Bataillard (Zürich) (Bataillard, 1975), from Stuttgart, J. Haeusler (Karlsruhe), A. Sahm (Munich), and E. Zander (Hamburg), who institutionalized the German proactive controlling through WEG.

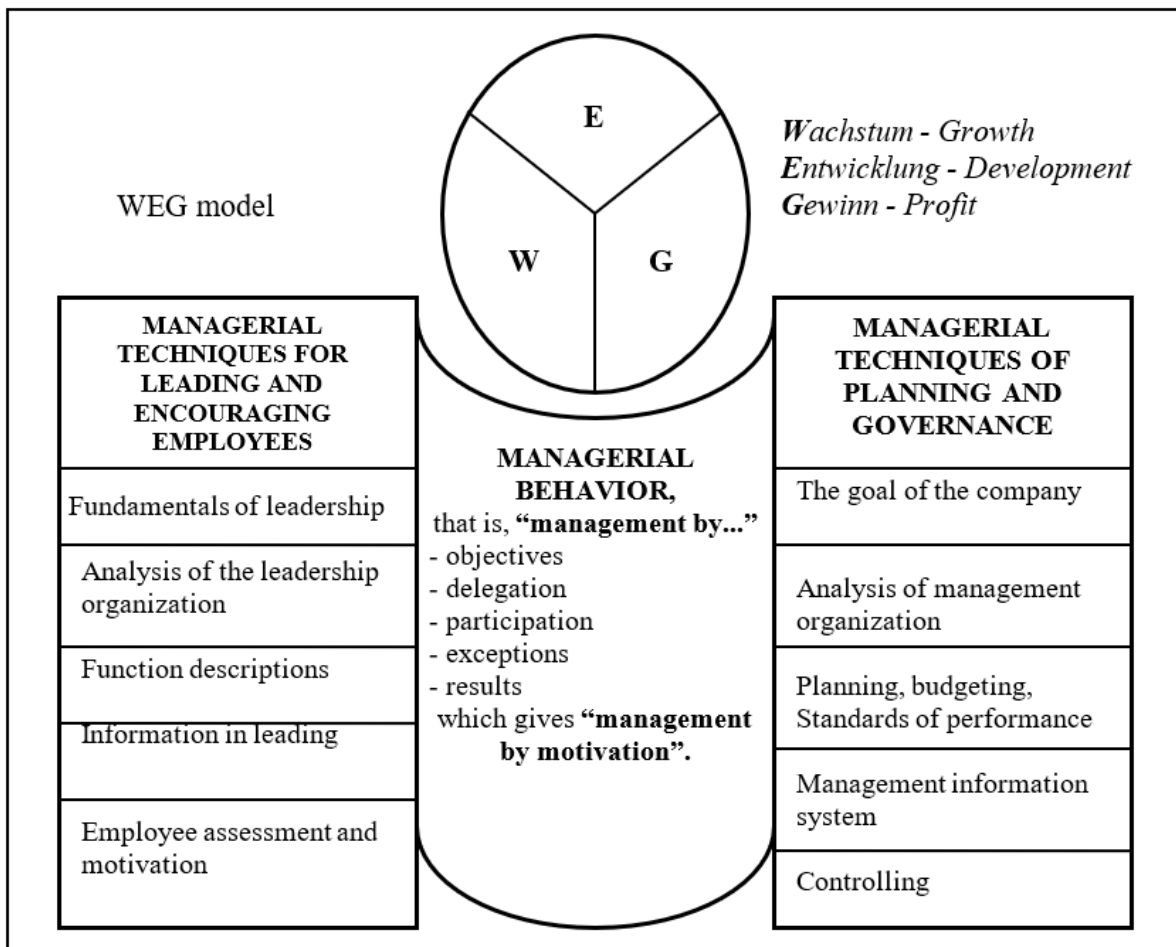


Figure 1. WEG as a Scalable Platform for Management by... Mechanisms
Source: Deyhle, 2003

The model rests on the three pillars of the WEG triangle:

- Wachstum – growth of market shares – Wachstum: market shares +15% per year (Deyhle's benchmark for German SMEs).
- Entwicklung – innovations and competencies.
- Gewinn – long-term profitability.

The model established five basic Management by... mechanisms, so Deyhle's original framework contains five key mechanisms that form the operational bridge, consisting of:

1. Management by Objectives – participative goal setting.
2. Management by Participation – involvement of employees – Participation: 80% of employees involved in setting KRA objectives (Deyhle, 1980a, p. 142).
3. Management by Delegation – decentralized responsibility.
4. Management by Exception – focus on deviations.
5. Management by Results – measurement and rewards.

Regarding this model, one must understand that it contains the open scalability of the system, that is, openness for the development of Management by... Scalability is achieved because the theoretical innovation of the WEG model lies in its flexible architecture, unlike rigid systems with fixed five mechanisms. The entire WEG system is suitable for interweaving additional Management by... modules (Time, Risk, Sustainability) in proportion to the complexity of the organization and the specifics of the industry – Wachstum: market shares +15% per year (Deyhle's benchmark for German SMEs). This fact is important to understand and recognize in order to make the entire WEG system better applicable. Moreover, the WEG system takes a role model into account as a catalyst, so the WEG circle functions as a Vexierbild (optical illusion) which consists of two sides:

- Left side: shapes corporate beliefs („leader of sustainability“) – Corporate beliefs: „problem solver“, „health service provider“, „sustainability leader“.
- Right side: catalyses KPIs (quantitative goals).

As an integral part of the entire model, a profit balance is established where profit (Gewinn) establishes a compromise between growth and development, while the Balanced Scorecard visualizes the allocation of the R&D budget from profit. In order to make the entire system sustainable and resilient to change, a cyclic process is set in VUCA environments consisting of three phases of iteration:

1. Wege – definition of operational steps – Wege: Gantt chart of key milestones by WEG sub-objectives (Wachstum, Entwicklung, Gewinn).
2. Ergebnisse – checking deviations.
3. Gestaltung – correction and optimization.

In this way, the WEG model as a whole is resilient to VUCA conditions (Volatility, Uncertainty, Complexity, Ambiguity) (Bennett & Lemoine, 2014). In line with the German controlling school of management, which integrates planning and controlling as a single function, the WEG model universalizes Management by Objectives through five basic mechanisms (Objectives, Participation, Delegation, Exception, Results) which can be extended by an unlimited number of specialized modules according to the needs of the organization. It is precisely this fact and characteristic of Deyhle's WEG model and Management by... that calls for further research and development of this model.

Methods

Goals and hypothesis. The aim of the research is to develop a system from Peter Drucker's Management by Objectives to Albrecht Deyhle's WEG model, with a scientific contribution that explains how Deyhle's approach opens up „Management by... (many)“. The Deyhle model, developed with regard to new technological possibilities, encourages upgrading instead of copying, expanding the five keys „Management by...“ (Objectives, Participation, Delegation, Exception, Results) into a larger number of variants adapted to specific problem areas. This builds on Griffin's analysis of resource management, where each resource requires its own approach, extended to activities and situations: „each activity and situation has its own management“ (Griffin, 2015). A key difference exists between aim (general goal) and objectives (concrete steps towards the goal), as emphasized by Puhan and Thomson (Puhan, 2025; Thomson, 2014). The hypothesis states that Drucker's MBO, through Deyhle's WEG model, does not stop, but continues as a continuous development, shaping itself as „Management by... (many)“, adapted to concrete situations.

Methodology. The research is based on the desk research method, analysing the works of Peter Drucker (a naturalized American of German origin) and Albrecht Deyhle as well as the German school of management. As a further development, the case-study method is used to illustrate the transformation of Deyhle's five „Management by...“ (Objectives, Participation, Delegation, Exception, Results) into „Management by... (many)“ with 10 variants: Objectives, Participation, Delegation, Exception, Results, Time, Research, Sustainability, Risk, Customer.

Results

Management by... (many). The WEG model and Management by... are characterized by open system scalability, i.e., openness for further development of the Management by... approach. Limiting the approach to Deyhle's five basic forms (Objectives, Participation, Delegation, Exception, Results) is a subjective decision of the researcher, while reality requires a broader range of Management by... variants adapted to specific circumstances. In line with Griffin's view that each resource has its own management, extended to “each situation or activity leading toward the goal has its own management,” this leads to the WEG model which enables distinguishing *objectives* on the path toward the *aim*. In this way, Deyhle's Management by... is upgraded into “Management by... (many)”. The following example will further clarify this approach.

WEG Model „Management by... (many)“, Mangulica Production. Food production is one of the four strategic pillars of every state (food, armaments, health care, and energy). In both peaceful conditions and in situations that threaten the state and the nation, food has special importance, which calls for a responsible strategic approach. When food and health are connected, food production is directed toward healthy food that must be accessible to consumers at all times. According to official data, pork is the most commonly consumed meat in the EU (Agriculture and Horticulture Development Board (AHDB), 2024a) with per-capita consumption of about 28–31 kg per year, while poultry

(chicken) is growing rapidly and approaching approximately 25 kg (Statista, 2024). Chicken is the most affordable in price, with an average retail price of about 3 €/kg (2025), in contrast to pork (~2–3 €/kg) and beef (~7 €/kg) (Meat Borse, 2025). Thus, strategic calculations in terms of the food policy of every state, within the meat production segment, must be oriented toward pork and poultry meat. This fact has conditioned the development of many types of pork and chicken meat, so that, for example, the breeding of mangulica pig has become particularly important and economically profitable. Mangulica is a Croatian autochthonous pig breed known for its extremely fatty backfat, which contains a high proportion of monounsaturated („Monounsaturated“ is the Croatian technical term for monounsaturated fatty acids – those that have one double bond in the carbon chain; Wikipedia. fatty acids) fatty acids (such as oleic acid), thereby significantly lowering its cholesterol compared to ordinary pigs (Agriculture and Horticulture Development Board (AHDB), 2024b). For this reason, it is sought-after among gourmets and in the premium segment, as it offers a healthier alternative with an intense taste (EUromeatnews, 2025). Given the above, it is necessary to justify the *objectives* steps on the way to the *aim* in mangulica production. In order for this *objectives* path to carry minimal risk and to be controlled-wise monitored from all aspects, it is necessary to establish a WEG model system “Management by... (many)” for mangulica production, with all calculations of a pilot project.

WEG Model „Management by... (many)“, Mangulica Production, Calculation.
Input/starting situation: Farm XY, starting on 1 January 2026, aims at an annual production of 5,000 tonnes of pure mangulica meat without cholesterol for the EU, starting from Christmas 2027. This is a process within a complex value chain (breeding → fattening → slaughtering → distribution). If one starts from Deyhle’s original five „Management by...“ mechanisms, then Deyhle’s WEG (Wege → Ergebnisse → Gestaltung) operationalizes Drucker’s MBO through five key mechanisms which form a “bridge” from the strategic objective *objectives* to the results.

Strategic goal: 10,000 piglets = 2,500 tonnes of pure meat; with a reserve of 16,000 piglets = 4,000 tonnes + 20% buffer for the 5,000-tonne target. This system would look as follows (Deyhle, 1980b) (Table 1, Table 2).

The mangulica breeding timeline (staggered cohorts) proceeds in such a way that the first cohort begins in January 2027 and by November 2027 produces 1,600 piglets. With 10 staggered cohorts (distributed over the year), a total of 16,000 piglets is obtained by 15 December 2027. From this follows the calculation: 2,000 piglets per month × 10 months = 20,000 inputs → 16,000 delivered piglets (80% live meat). The standard result of 80% live meat includes mortality, rejection from the sow, and losses during mangulica breeding.

The described process, according to the Deyhle WEG (Wege → Ergebnisse → Gestaltung) model with the now already classical five Management by... (Objectives, Participation, Delegation, Exception, Results), due to a number of problems along the way of production, breeding, but also the development of the mangulica breed, can be extended to 10 Management by.... In this way, numerous risks in the mangulica meat production process “breeding → fattening → slaughtering → distribution” are addressed (Table 3).

Table 1. Deyhle's WEG Model with 5 Management by... in pig mangulica production

Management mechanism	Description for mangulica	KPI/Sub-aims	Example of execution
1. Management by Objectives	Strategic goal: 5,000 tons of clean meat by December 15, 2027*	20,000 piglets × 250 kg × 80% survival = 4,000 tons + reserve	Cascade: breeding (2,000 piglets/month) → fattening (10 months) → slaughter
2. Management by Participation	Team setting sub-aims	90% of employees participate in KRA; monthly workshops	Veterinarians + breeders define the EU PDO certificate
3. Management by Delegation	Responsibility by chain stages	Breeding: 2,000/month; Fattening: +0.8 kg/day/pig	Phase leaders with IoT sensors (temp, food pH)
4. Management by Exception	Real-time detection of deviations	Alarm if cholesterol is less than 0.1% in the meat content or growth is more than 0.8 kg/day	Batch isolation + food correction (e.g. pH or nutrient adjustment for optimal mangulica growth)
5. Management by Results	Quarterly review + correction	5,000 tons delivered; profit higher than 20% (8-10 €/kg)	Iteration: +20% breeding for 2028

Source: own elaboration

* EU PDO certificate for mangulica (cholesterol-free backfat): premium price 8–10 €/kg. From an operational viewpoint, the flow of the complex value chain process (breeding → fattening → slaughtering → distribution) of mangulica could be mathematically represented as a throughput from 2,000 piglets/month to 10,000 piglets. If one takes a somewhat slower growth of mangulica from 1 kg → 4–6 weeks of adjustment (8–10 kg) → 300 days of fattening up to 250 kg, specifically the black Slavonian/mangulica breed requires 9–12 months to reach 250 kg (regenerative feeding).

Table 2. Dynamics of the 2,000 piglets/month flow

Phase	Duration	Entrance (monthly)	Exit (250 kg)	Survival
Weaning	0-1.5 months	2.000 pigs	1.800	90%
Fattening 1	1.5-4 months	1.800	1.700 (50 kg)	94%
Fattening 2	4-7 months	1.700	1.650 (150 kg)	97%
Fattening 3	7-10 months	1.650	1.600 pigs	97%
Total	10 months/cohort	2.000 × 10 = 20.000	16.000 pigs	80% live meat

Source: own elaboration

Table 3. Expanded WEG Model on 10 „Management by... (many)“ Mechanisms

Management mechanism	Description	KPI	WEG pole/bridge
1. Management by Objectives	Setting clear goals	Achieved 80% yield (live meat)	Ziele
2. Management by Participation	Involvement of the team in decisions	90% of employees in planning	Mitwirkung
3. Management by Delegation	Delegation of responsibility	70% of tasks decentralized	Delegation
4. Management by Exception	Focus on deviations	More than 5% variation from plan	Ausnahme
5. Management by Results	Outcome measurement	Profit higher than 20%; 16,000 piglets	Ergebnisse
6. Management by Time	Time milestones for Christmas	Gantt: piglets Feb → delivery 15.12.	Wege
7. Management by Research	Development of new mango varieties	2 varieties per year; test of 500 pigs	Wege
8. Management by Sustainability	EU Green Deal compliance	100% food without antibiotics; CO2 more than 2 t/pig	Ergebnisse
9. Management by Risk	Predictive based management	less than 2% disease; +20% piglet reserve	Gestaltung
10. Management by Customer	Market feedback	NPS more than 85 points; blockchain tracing	Ergebnisse

Source: own elaboration

Therefore, given that the Deyhle WEG model is not rigid, in this example it is extended from the original five to ten mechanisms for the 21st century, each representing a specific Management by... adapted to scalable situations such as mangulica breeding (Deyhle's classical original WEG + the extension with „Management by... many“). In this way, the risk of the results is reduced and the development is amplified. The WEG logic is realized: Ziele → Wege → Gestaltung → Ergebnisse, as a whole that begins with Ziele (1) → Wege (6,7) → Gestaltung (9) → Mitwirkung/Delegation/Ausnahme (2–4) → Ergebnisse (5,8,10). Refining the classical five-mechanism WEG system into ten Management by... makes the entire process stronger, more resilient to risks, and directs it toward research in the direction of new mangulica breeds.

Discussion

The results empirically confirm the hypothesis: Deyhle's WEG model not only operationalizes Drucker's MBO but also scales it up into „Management by... (many)“, as shown by the mangulica case study. The described mangulica case study extends the original five classical mechanisms (Objectives, Participation, Delegation, Exception, Results) by an additional five (Time, Research, Sustainability, Risk, Customer). In the

complex value chain (piglets → weaning → 10-month fattening → slaughter), the WEG cycle (Ziele → Wege → Gestaltung → Ergebnisse) achieves an 80% yield (of live meat, from 20,000 inputs to 16,000 piglets), minimizes risks (less than 2% disease-related, +20% reserve) and delivers KPIs such as NPS above 85 points, CO₂ below 2 t per pig, and profit above 20% at a premium price of 8–10 €/kg.

The German controlling tradition (Freiburg ordoliberalism, Mannheim ICV standards) goes beyond the American reactive approach (Goetz: controlling only for corrections), offering proactive flexibility for VUCA crises (dot-com 2000, reunification 1990s). Application to the Croatian context (mangulica PDO, tourism and others) demonstrates universality, under the notion that each activity has its own Management by..., building on Griffin's thesis about resources.

In terms of research limitations and the need for further work, desk research plus simulation require a longitudinal pilot farm test (2027). Moreover, future research can validate the 10-mechanism model against EU Green Deal certificates and compare this study with hybrid breeds.

Conclusions

This research tracks the evolution from Peter Drucker's Management by Objectives (1954) to Albrecht Deyhle's WEG model (1980), demonstrating its inherent scalability. Through desk research and the mangulica pig case study, the research hypothesis is confirmed. Deyhle's WEG model, through its scalability, expands MBO into Management by... (many) from the original five mechanisms, thereby upgrading it with an unlimited number of modules (e.g., Time, Risk, and others). The scientific contribution of this paper lies in the fact that the concept of Management by... (many) is formulated for the first time as a continuous extension of the Deyhle framework, where "each situation has its own management." The results offer operational guidelines for EU and Croatian SMEs in agriculture, nautical tourism, and other industries. In line with the research in this paper, the following key conclusions are drawn:

- a) The research hypothesis is confirmed: Drucker's Management by Objectives leads through Deyhle's WEG model to Management by... (many) as a cyclic development.
- b) The scientific contribution of this research is the new concept of Management by... (many), extending Griffin's thesis from resources to activities and situations.
- c) The scalability of the WEG model enables the transition from 5 to 10 mechanisms (Table 3) for managing the complexity of the value chain.
- d) Economic results show an 80% yield, less than 2% disease-related mortality, and a profit above 20% at a price of 8–10 €/kg for mangulica.
- e) Risk management is achieved through staggered cohorts (20,000 → 16,000 piglets) with additional reserves.
- f) Sustainability is ensured by CO₂ emissions below 2 tonnes per pig, in line with the EU Green Deal.
- g) Customer focus is achieved through an NPS above 85 points and blockchain tracing for the PDO certificate.

- h) German proactive controlling surpasses the American reactive approach (critique of Goetz).
- i) Implications for Croatia and the European Union include the application of the WEG model to many industries, for example tourism, marinas, and others, in line with Griffin's link between management and resources.
- j) Future research suggests pilot farms in 2027, WEG software development, and longitudinal validation.

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Declaration of Competing Interests

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

No new data were created or analyzed in this study. This article is based on published literature and technical materials cited in the reference list.

Use of Generative AI and AI-Assisted Technologies

Generative AI assisted in language refinement during the preparation of this manuscript.

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