Figure 3.A. shows how crisis situation can arise as far as an individual, the 'hotel guest', is concerned arising from a 'disaster' or a 'disorder' unexpected as far as the 'airport bus' is concerned and has materialised out of the normal course of events as suggested in point **I.** However, the 'driver of the airport bus' playing the part of 'crisis management' took the initiative and averted the crisis by 'taking a short cut'. In this case, th effect of 'crisis management' is taken into account by introducing a 'calculating property, 'cd', which is a device in linguistic modelling.

The 'traffic jam' which plays the part of 'disorder', appears unexpected to the 'driver of the airport bus' but, in general, events can evolve gradually before they are perceived as 'disasters' or 'disorders'. For example, in the 'health service' of a country doctors can gradually resign due to better pay and working conditions elsewhere before the 'health service' is declared to be in a 'crisis situation' because it is seen to be unable to provide the services to patients as expected in normal circumstances and as such the situation is 'life threatening'. Also, 'disasters' do not necessarily followed by 'crisis situations'. For example, 'collapse of the bridge across a river last month' was an unexpected, instantaneous and local event which was not followed by a situation considered to be a 'crisis'. In the case depicted in Figure 3.A. the effect of 'delay by the airport bus' need not have been a 'crisis situation' if the 'hotel guest' could have caught a later aeroplane.

DISCUSSION

The structural nature of any part of the world is universal which is asserted by the 1st general principle of systems. Accordingly, the structural or systemic description is pervasive, empirical and indivisible and supplemented by the application of a particular

selection of qualitative and/or quantitative properties dependent on the view, taste or opinion of an observer. Systemic description of 'aggregates' of constituents in static or

dynamic state shows the existence of **outcomes** which is indicated in Figure 1. in case of human activity scenarios which is the general case [Korn, 2018].

The term 'outcome' refers to attempting resolution of a 'problematic issue' by a 'product' through its interaction so as to induce the change from 'initial to final state' of object carrying the 'problematic issue' as shown in Figure 2.A., for example. The change of state is carried out so as to match the expectation of a User/consumer shown in Figure 2.B. if there is one. The term 'problematic issue' designates a statement of 'initial state' of affairs carried by a theoretical object which is subjectively regarded as 'problematic' and is based on an impression to lead to a **consistent** final state which is supposed to be its resolution. A 'theoretical object' is a part of the world concrete, abstract or symbolic which is predicated by one or more statements such as object 1. in Figure 3.A., for example. An 'empirical object' is one that is perceived by any of the senses as a whole. We have the following **cases** or kinds of **outcomes** of scenarios :

1. Activities by aggregates composed of : Inanimate, natural objects like a 'volcano' which are directed at achieving a **state of equilibrium**, 'static' like a 'rock embedded in the side of a mountain' or 'dynamic' like the 'steady flow of a river'.

Achievement of a state of equilibrium is the objective of **all** activities otherwise there would be chaotic, incessant changes prevailing at all times in all places. In this case the outcome of an aggregate is seen as the state of static or dynamic equilibrium preceded by generation of heat due to 'losses' such as friction, as described by the 2nd law of thermodynamics [Korn, 2012].

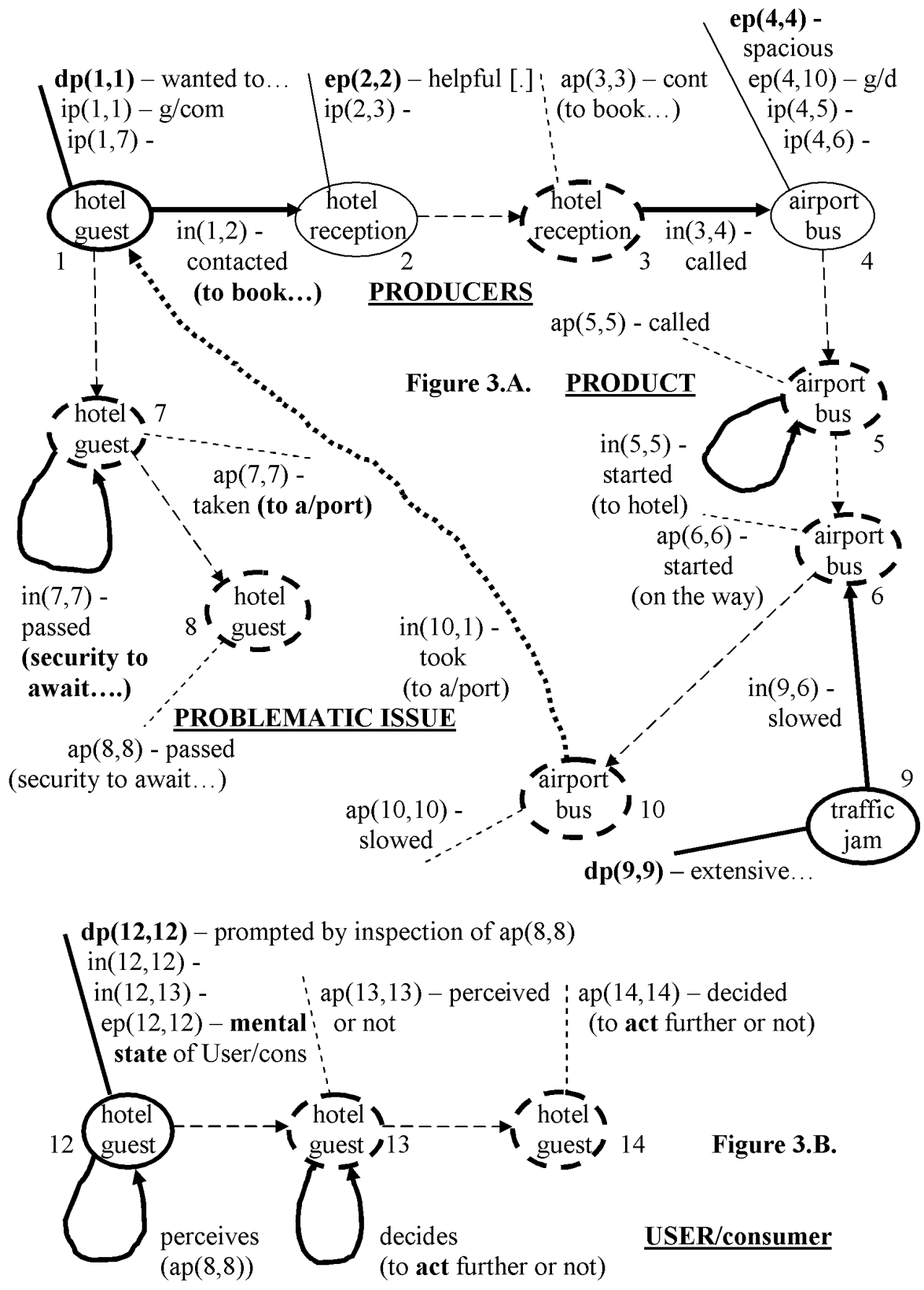

Figure 3. Semantic diagram of modified ‘hotel guest’ scenario

2. Activities by aggregates composed of : Inanimate, artificial objects like an 'engineering, control system' or a robot which are directed at achieving a **final state** of a 'problematic issue' set by a human element. This state is the equilibrium state of an aggregate which can be static [position control] or dynamic [speed control] which is its outcome as indicated in Figure 1. [Nise, 2008, Korn, 2012].

3. Activities by aggregates composed of : Wholly or partly by human beings like a 'church congregation' or a 'train accelerating towards a station' which are directed at achieving a **final state** of a 'problematic issue' set by a human element. The rest is the same as in point **2.** except the final states the range of which, apart from survival, is **infinite** because the ideas for action and inventions generated by human imagination is infinite. They can be directed towards achievement of ambitions, creating 'products' for convenience, entertainment, reaching to new places, creating new expressions as in art and so on with human constituents requiring special physical **environments**. The problematic situations with **crisis** belongs to this category.

Final states to be achieved by plants and animals are set by the hereditary mechanism and restricted to serve survival. The scheme in Figure 1. is still applicable with 'producers' with 'management' provided by a brain/mind assembly directed by instinct fuelled by the hereditary mechanism and chance, 'product' such as grazing, 'problematic issue' such as hunger and User/consumer which is the plant or animal itself. No artificial products are produced.

4. Activities by aggregates composed of :

1. Humans, inanimate, artificial objects, or

2. Animals and/or plants and inanimate, natural objects engaged in activities in ---

Manufacturing [fabricating components of car engines, bird carrying twigs], assembling [assembling car engines or a nest of twigs], delivery [transporting cars to dealers or food to young] or service systems [preparing hotel room for a guest]. They deal with creating **products** to be represented as 'linguistic networks' which yield a variety of choices through variation of their topology and act as a numerical measure of **complexity** [Korn, 2009, 2013].

Categories 1., 2., 3. are called 'consumer systems', 4. is called 'production systems'. In categories 2., 3., 4. aggregates or systems are engaged in **problem solving** because 'problematic issues' can be identified and their resolution requires structures operating in purposive configuration which must be **designed** or '**engineered**' [Lewin, 1981].

The model for implementing the 'principles of structural description' pervading the contents of points 1., 2., 3., 4. needs to be universal, a characteristic possessed by the symbolism of **processed natural language** supplemented by 'mathematical models of conventional science' at the individual or object level to aid decision making or computation, for example. The semantic diagram in Figure 2. depicts such a model [Korn, 2018]. This is done essentially by **linguistic modelling** which formalises a story or narrative in 'natural language' with or without making a 'problematic issue' explicit.

Points **I., II.** have been arrived at from consideration of the topics currently available in the field of studies of crisis situations. This is followed by the application of 'systems thinking' in particular 'linguistic modelling' demonstrated by a simple example. Based on the discussion above, **crisis** situations fit into category 3. with all categories covering the spectrum of possibility of occurrence of outcomes.

Linguistic modelling is characterised by ---

1. 'For a given whole represented by a semantic diagram of 'management/producers and product' the outcome or resolution of a 'problematic issue' necessarily follows, subject to :

Resolution is acceptable to User/consumer,

All theoretical objects exist and behave i.e. interact as prompted by their individual characteristics. For example, an elastic spring when 'compressed as a result of stored mechanical energy' and 'released', will produce an 'interaction of force' or a person when 'benevolent' and 'encounters a beggar', is likely to produce an 'interaction by giving money'. This notion integrates divers phenomena from different domains. However, the difference is that in the first case the interaction prompted or triggered is determined but in the second it is only probable.,

Progression of correct **semantic** correctness. For example, 'a person furious with his neighbour smiles at h/her at the same time' describes a physically impossible event which blocks progression',

Acceptable uncertainty,

Correct matching of properties of constituents of producers and product to User/consumer.

2. A symbolism usually is created to say something about a part of the world, it carries information [Korn, 2010]. Since any part of the world is structurally organised according to the 1st principle of systems to carry out its task a symbolism must also be structurally organised, it is a 'system'. A major problem with all kinds of symbolisms used for creating models of parts of the world is their relation with these parts or the establishment of **meaning** of elements of a symbolism. In conventional science of physics the meaning of quantifiable symbols is precisely and operationally determined to be fed into mathematical models [Anon.,1970]. In the Viable Systems Model of S. Beer, for example, the meaning of symbols is vague or not stated [Jackson, 2000]. In other fields such as astrology the relation between a symbol such as 'movement of the planet Mars in a certain way' and the 'predicted events concerning a certain type of person' is not established.

The symbolism of linguistic modelling is elements of natural language organised into reasoning schemes and the relation or meaning of these elements to parts of the world is well established.

3. The availability of explicit, structural description facilitates consideration of any number of **alternative** structures and/or agents or objects with different characteristics for the achievement of resolution a 'problematic issue' acceptable to a User/consumer.

The three principles of systems with linguistic modelling as the symbolism of their means of implementation and including application of conventional science of physics, is suggested to create an integrated scientific enterprise [Korn, 2018]. It has its roots in branches of knowledge, eminently teachable and gives guidance to problem solving through design thinking. However, it has not been applied to larger scale scenarios like parts of an organisation or world problems [Meadows, et al., 1972] and needs software development to work out the dynamics of scenarios designated by the dotted, directed lines in Figure 2., selection from alternatives and possibly learn from the exercise etc. A possible connection with AI may need to be explored.

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