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REORGANIZATION OF SUPPLY CHAINS AS A KEY FOR THE ENVISION OF SOCIO-TECHNICAL TRANSITIONS. THE CASE OF TOURISM

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WORKING PAPERS

2019/03

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Title: REORGANIZATION OF SUPPLY CHAINS AS A KEY FOR THE ENVISION OF SOCIO-TECHNICAL TRANSITIONS. THE CASE OF TOURISM

ISBN: 978 88 68512 132

Prima Edizione: Marzo 2019

Viale Bonaria 98 - 09125 Cagliari
Tel. 070/6848663 - info@arkadiaeditore.it
www.arkadiaeditore.it

Reorganization of supply chains as a key for the envision of socio-technical transitions. The case of tourism

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Abstract

As stressed by the literature on technological change, not only production and logistics activities take place along supply chains, but also innovation processes. It is then surprising that in the extensive research field of socio-technical transitions, the supply chain – and its actors – are seldom considered as a key point of the analysis. This paper aims at filling this gap of the literature by showing that the understanding of the on-going reorganization of supply chains – and the possible conflicts between actors it brings along – is a key to envisage socio-technical transitions and scenarios. A specific attention is given to conflicts between new entrants, that bring along a disrupting innovation, and dominant incumbents that resist to change. Tourism is proposed as a reference case just because the on-going radical change of its supply chain of vertically interrelated industries is currently led by a bunch of internet-based new entrants. Direct interviews to tourism experts and operators are used to build and evaluate three alternative socio-technical scenarios of tourism. Tourism scenarios do not emerge from the different use of the Web, but from a different reorganization of the tourism supply chain, each being led by different actors. Under this light that reorganization of the tourism supply chain is not just one of the effects of the increasing relevance of the Web in tourism, but it is *the* innovation. This consideration may be relevant for all other sectors whose supply chain is currently disrupted by new entrants that bring along an emerging technology.

Keywords: supply chain, socio-technical approach, scenario analysis, tourism.

Jel classification: O3, Z3.

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1. Introduction

The supply chain can be defined as the set of vertical (usually inter-industry) relationships, along which production and logistics activities take place to bring a specific product or service to the market. Leading scholars of innovation have shown that the supply chain is also the environment where innovation processes deploy: minor innovations may emerge from the cooperation between suppliers and users of a specific technology (Pavitt, 1984); more relevant innovations may imply that the supply chains must be reorganized in order to integrate a new input (Lundvall, 2010); new general-purpose or enabling technologies may result in one or more brand new supply chains (Teece, 2018).

Notwithstanding the above considerations, in the extensive research field of socio-technical (ST) transitions (van den Bergh et al., 2011; and Markard et al., 2012), the supply chain and its actors are seldom considered as the entry point – or a key point – of the analysis. This is somehow surprising because the supply chain is by definition an actor-based concept, as such consistent with the ST approach, where all techno-economic changes are coupled (if not supported) by networks of innovators (Smith et al., 2005; Musiolik et al., 2012). The supply chain should therefore be considered as the natural candidate for the vertical dimension of such networks.

With this paper we try to fill this gap in the literature, showing that adequate understanding of the on-going reorganization of supply chains is a key to envisage ST transitions and scenarios. A specific attention is given to conflicts between actors along the supply chain that can result in alternative ST pathways to the future. In particular, we look at conflicts along supply chains that are generated by new entrants that bring along disrupting technologies, and by dominant incumbents that resist to change. The guiding thesis of the paper is that – just because of its relevance for the analysis of innovation processes – the supply chain should be considered when looking for the constituents of any ST system or for the key drivers of any ST transition.

Tourism is proposed as a reference case to verify this thesis, for two reasons: first, because it is usually considered as a supply chain of vertically interrelated industries (hotel, travel, brokering and organization, etc.); second, because internet-based new actors are entering tourism and radically changing its supply chain. Founding the analysis on the relevant scientific and grey literature and on two rounds of direct interviews to experts and operators, alternative ST scenarios of tourism are built, each presenting a different outcome of the on-going conflicts between new entrants and incumbents. A third round of interviews is used to evaluate the alternative ST scenarios, in terms of both likelihood and desirability.

The proposed approach proved useful to envisage the future of tourism. It is apparent that the reorganization of the tourism supply chain is not just one of the effects of the increasing relevance of the Web, but it is *the* innovation. Tourism scenarios do not emerge from the different use of the Web, but from a different reorganization of the tourism supply chain, each being led by different actors.

Such a shift of the analytical focus – from an emerging technology to the potential leaders of a brand new supply chain – may be applied to the envisioning of the socio-technical transition of many other sectors – and even societal functions – whose relevant supply chain(s) are currently disrupted by new entrants that bring along an emerging

technology (the Internet of Things, machine learning, big data analytics, artificial intelligence, etc.).

The rest the paper is structured as follows. The next Section shows that the ST literature on innovations and transitions devotes a limited attention to supply chains and its actors. Section 3 deals with the analytical method used to build the case study on tourism. The paper is closed by Sections 4 and 5, where the scenario analysis of the supply chain of tourism is presented and discussed, respectively.

2. Literature review

All approaches to ST transitions refer to some common theoretical roots: complex systems theories, neo-Schumpeterian theories of innovation, other sociological and institutional representations of innovation. Therefore, no taxonomy can provide clear-cut distinctions between them. For example, Van den Bergh et al. (2011) and Markard et al. (2012) provide two different – but partially overlapping – taxonomies of the main approaches to ST transitions; both include the multi-level perspective (MLP) and the innovation systems (IS) approach but both consider in different ways some other approaches (transition management, strategic niche management, evolutionary systems). To confirm that a distinction between such approaches has no robust theoretical foundations Markard and Truffer (2008) suggested to integrate the two most prolific approaches in terms of publications and citations: the MLP and the IS. Here we refer in particular to these two approaches to ST transitions as they are the only ones where the supply chain is somehow considered.

In the MLP approach (Geels: 2002, 2005a, 2005b and 2010) suppliers are considered as a part of the multi-actor network supporting a ST regime; it is also acknowledged that new supply chains and user-producer relations must be built in innovation niches. But then the supply chain and its relationships remain in the shadow when a specific innovation process is analyzed. The IS approach explicitly considers the supply chain as a key concept, as upstream and downstream actors are acknowledged as part of the networks of IS. But even here, the reorganization of the user-supplier network that supports the existing supply chain – and even the entry of new actors – is mostly considered as a needed evolution (and not as a cause) of the innovation process (Hekkert et al., 2007; Bergek et al., 2008; Jacobbson and Bergek, 2011). A similar approach is developed by Papachristos (2014), Sanden and Hillman (2011) and Markard and Hoffman (2016): the former focuses on the inertia of the supply chain of an existing ST system that can hamper a sustainability transition; the latter scholars study those vertical complementarities (or symbioses) that can accelerate the development of an emerging technology, thus facilitating the transition to a new socio-technological system. Simmie et al. (2014) and Steen and Weaver (2017) develop the same reasoning, but with attention to the geographical and cross-sectorial articulation of the considered supply chains.

In all above cases, the supply chain is considered just as a retarding or facilitating factor of an innovation that is conceived elsewhere, and not as the main analytical locus for the understanding of its genesis, evolution and outcome. No specific attention is given to those conflicts that are generated along a supply chain when new entrants bring along a new technology and use it to disrupt and take over the supply chain itself.

3. Method

A gradual and iterative approach was followed to develop the case-study. Interviews with around 20 experts and operators were the main analytical tool (see Table 1 for a synopsis of the interviews): the number and the diversity of interviewees proved sufficient to generate alternative scenarios.

After a preliminary analysis of the relevant scientific and grey literature, a first set of interviews with (mostly academic) experts was carried out with the aim of figuring out: a) the relevant actors of the tourism supply chain and their relationships, also looking at which ST configurations arise (one or more ST systems and niches); b) any change in demand and any political issue useful to understand how the supply chain of tourism will change.

Results of the first round of interviews were used to build a first version of the current supply chain of tourism and the three alternative scenarios. The second round of interviews – still with experts – focused on the selection of the relevant current trends of change in the tourism supply chain, and in the respective leading actors. Also comments on the first version of the scenarios were requested. Following these comments, a final version of the scenarios was delivered. A third and last round of interviews with tourism operators was used to evaluate the final version of the scenarios, in terms of likelihood and desirability, and to understand what public-private actions might influence the likelihood of the more or less desirable scenarios.

The case study on tourism is divided in two parts. The first one presents the current situation of tourism, based on both the analysis of the literature and the interviews with experts (first and second round). Whenever relevant, reference is made to a specific interview; each interview is quoted with a two-digit code, the first digit refers to the list of interviews that can be found in the Appendix, the second digit refers to the round of the interview. The second part presents the three alternative scenarios, whose evaluation is based on the whole set of the interviews with operators (third round).

Both the current situation of tourism and the scenarios are represented with a simplified chart. Two key dimensions are used to position tourism actors: the horizontal dimension represents their marketing focus, either on tourism products or on destinations; the vertical dimension represents their reputation, as brokers/aggregators or as single service operators. Such two dimensions resulted from the preliminary analysis of the literature on tourism and the succeeding first round of interviews with experts.

A rectangle with a normal outline represents each category of tourism operators. Dominant positions, whenever existing, are represented with a thicker outline; dominant operators are inside such a rectangle. Other operators that are in a strategic relationship with the dominant one(s) are linked to it by an arrow (see Table 2 for the legend of all charts).

Figure 1 represents the current situation of tourism; this is the starting point of the three alternative transition pathways, each resulting in a new chart representing a scenario (Figures 2-4). All charts do not refer to a specific geographic area; on the contrary, an explicit attempt is made to deliver an analysis representing all the dynamics relevant at a global scale.

Table 1. Case study: synopsis of the interviews

Interview round	Interviewed	Focus
First	11 Tourism experts: - 8 academic (research fields: management, economics, geography, law) - 3 institutional	Selection of relevant tourism operators and their relationships. Selection of the two dimensions of the charts (current situation and scenarios).
Second		Selection of most relevant current trends in tourism. Comments on charts (current situation and scenarios – 1st version).
Third	8 Tourism operators	Evaluation of charts (scenarios – 2nd version): likelihood and desirability. Selection of actions to increase (reduce) the likelihood of more desirable (undesirable) scenarios.

4. Results

4.1 Current situation and on-going trends

Tourism is a growing global sector and this trend is confirmed for the future by all forecasts. Tourism growth is supported by two phenomena: the increasing demand of emergent countries (China, Russia, Arab countries, etc.) and the availability of low-fare air services (OECD, 2018; WTO, 2018; WTTC, 2018).

Tourism is highly segmented. Mass products (e.g., the seaside or the cultural tourism) stay together with specialized tourism products (business, religious, sport, wellness, etc.) and niche products (e.g., hunting tourism) (WTO, 2018). The segmentation of tourism is highly dynamic, because of both the changing weight of existing segments and niches (e.g., the increasing quota of tourism services specifically designed for the elderly), and the emergence of new ones (e.g., the so-called "volunteer" tourism) (Dwyer et al., 2008). Because of such a high segmentation, operators usually feature a market focus on some very specific products or destinations (Int_US1; Int_PT1).

Notwithstanding its segmentation, it must be stressed that – in socio-technical terms – tourism can be considered as a single system, and not as a set of competing systems (Int_MO1; Int_PT1; Int_DC2); even the so-called "alternative" or "sustainable" tourism is served by (specialized) operators that largely follow the same business routines of all other operators, also when they bring along a very specific – and very marginal – political discourse (Weaver, 2014). Other than for the latter, political issues are not relevant in the tourism sector (Shanks, 2009); with very few exceptions, national, regional and local policies focus on the promotion of specific destinations and their specific products (Int_MO1). The only emergent political issue is the carrying capacity of destinations, and its regulation with alternative measures, such as quotas and fees (Klaric et al., 2003; Cole and Razak, 2009; Int_BR1; Int_DO1; Int_PR1; Int_PZ1). The more general issue of the sustainability of

tourism is mostly a declaration of intent with no relevant impacts on the actual organization of tourism (Int_MO1; Int_DC2).

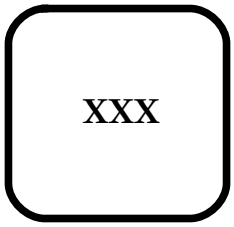
The tourism business model is twofold: the sale of individual tourism services produced on their own by operators; the brokerage or aggregation of services produced by others. It is precisely the importance of tourism brokerage and aggregation that makes the supply chain of tourism a relevant research issue.

The supply of tourism is highly concentrated. Bigger global operators can be found among tour operators, internet-based aggregators, air companies, hotel chains (Int_MO1; Int_BI2; Int_PR1); cruise companies and some car hire companies are global operators too (UNCTAD, 2007; Dwyer et al., 2008). The supply of global operators is complemented by several smaller national and local operators. The picture of the today tourism supply is completed by finance operators whose importance is increasing, mostly in the hotel and internet-based industries, where they are entering as majority or minority shareholders, respectively (Int_MO1; Int_PT1).

No dominant position is apparent in the today supply chain of tourism. This also depends on the entry of big OTAs, i.e., global internet-based brokers and aggregators (such as Expedia, Booking, AirBnB, Trivago, etc.) who disrupted the traditional vertical relations between – on one side – tour operators and travel agencies, and – on the other side – air companies, hotels and other sellers of single services.

As a reaction to the increasing importance of OTAs, many other operators are changing their strategies (Heo, 2016; Varma et al., 2016; Hajibaba and Dolnicar, 2017): tour operators and big hotel chains are increasing their specialization on specific products or destinations, and on some countries' outgoing tourist flows (Int_BR1; Int_BI2; Int_PT1; Int_P2); travel agencies are turning into online brokers, if not declining or disappearing (Int_MU2). Moreover, a new kind of operator is emerging: the so-called destination manager organization (DMO), which focuses on the creation of a local network of tourism operators, often supported by some public authority (Int_MU2). DMO's activities may span from the traditional promotion to attract incoming tourists, to the promotion to – and possibly agreement with – other tourism operators (such as, tour operators and air companies), and to the actual aggregation of multiple services into tourism packages (Volgger and Pechlaner, 2014; Hristov and Zehrer, 2015). In the latter case, DMO can be considered as direct competitors of other (traditional or internet-based) aggregators (Int_PZ1).

Table 2. Legend of charts

Acronyms
AIR_T: Traditionali Air Companies AIR_LC: Low-Fair Air Companies DMO: Destination Management Organizations H_C: Hotel Chains H_L: Local Hotels OTA[a]: On-Line Brokers and Aggregators TO: Tour Operators
Graphical symbols
 Actors in a dominant position Other actors in strategic relationship with the dominant actors **YYY** **ZZZ** Other actors with no strategic relationship with the dominant actors

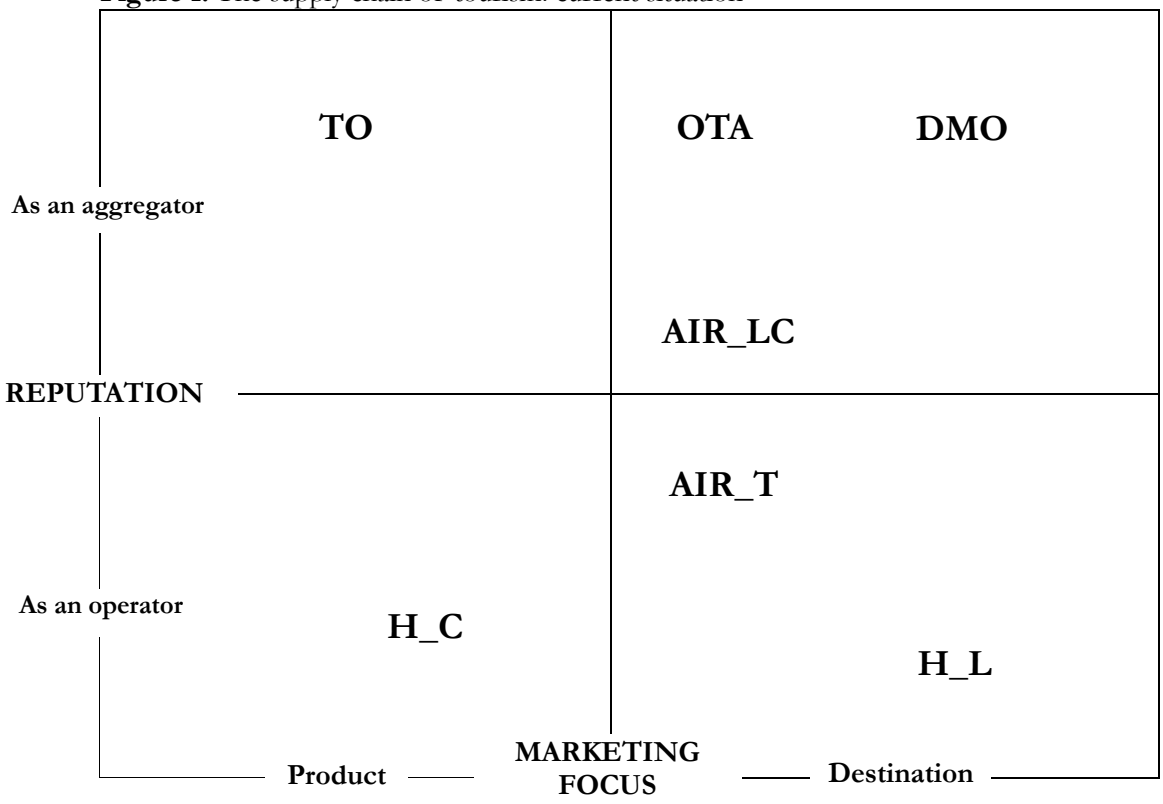
[a] OTA usually stays for Online Travel Agency. Following the common use, we consider as OTAs all (big) internet-based brokers and aggregators (such as, AirBnB, Booking, Expedia, Hotels.com, etc.) even they are not online travel agencies *strictu sensu*.

Not even the positioning of big OTAs is static. While they are at the forefront of business intelligence – using big data for the application of artificial intelligence to tourism (Int_PR1; Int_PT1) – they are also trying to counteract some (mostly local) opposition to their business model by selling tourism packages (instead of a single service, such as a room or a flight) and by experimenting with the specialization on products and on destinations (Int_BR1; Int_US1; Int_PZ1; Int_DC2).

In more general terms, the Web is today an essential facility that all operators – if aiming at a leading position – must integrate into their business model. Indeed, most operators along the whole supply chain have started using the Web as a direct contact to their clients (thus contributing to the marginalization of GDS and CRS technologies) (UNCTAD, 2007; Int_BR1). Some other operators are moving their business model towards the aggregation of others' services (e.g., car rental and accommodation); among these, low-fare carriers are in a prominent position, also because their internet site is the entry point of many travelers (Int_PT1; Int_MU2).

Starting from all the above information, it is possible to represent the current situation of tourism with a simple chart (Fig. 1). Only actors that can influence the future supply chain of tourism are considered; that is: DMO, hotel chains (H_C), internet-based brokers and aggregators (OTA), local hotels (H_L), tour operators (TO), traditional and low-fare air companies (AIR_T; AIR_LC). No dominant position is represented in the chart (and, consequently, no strategic relationships with it). This is because the current situation is highly fluid: old leaders (tour operators, air companies, etc.) have lost their preeminent role, and multiple re-articulations of the tourism supply chain may emerge in the next future, each featuring a different dominant position.

Figure 1. The supply chain of tourism: current situation



4.2 Alternative scenarios

The three scenarios presented here are built on the following trends highlighted during the interviews: the increasingly important role played by OTAs in global tourism; the chance that destination-based operators coalesce and empower; the tendency of tour operators – and other global operators – to specialize more on tourism products than on destinations. Each scenario is built by considering one of the above trends at a time as the prevailing one (Table 3); obviously, such a forced approach is followed just to single out the resulting changes:

actual transitions will take place in a much more blurred way and will result from the combination of all relevant trends.

Table 3. Scenarios: main trend and leading operators

Scenario	Main trend	Leading operators
1	Increasing role of on-line brokers and aggregators	OTAs
2	Coalescence and empowerment of destination-based operators	OTAs and DMOs
3	Divergence between tourism products (global operators) and destinations (local operators)	Global TOs
		Local TOs and local hotels

Scenario 1 – OTA leadership

This scenario builds on the following trend: the decreasing relevance of destinations. Big OTAs lead this trend and marginalize all local operators, and in particular DMOs.

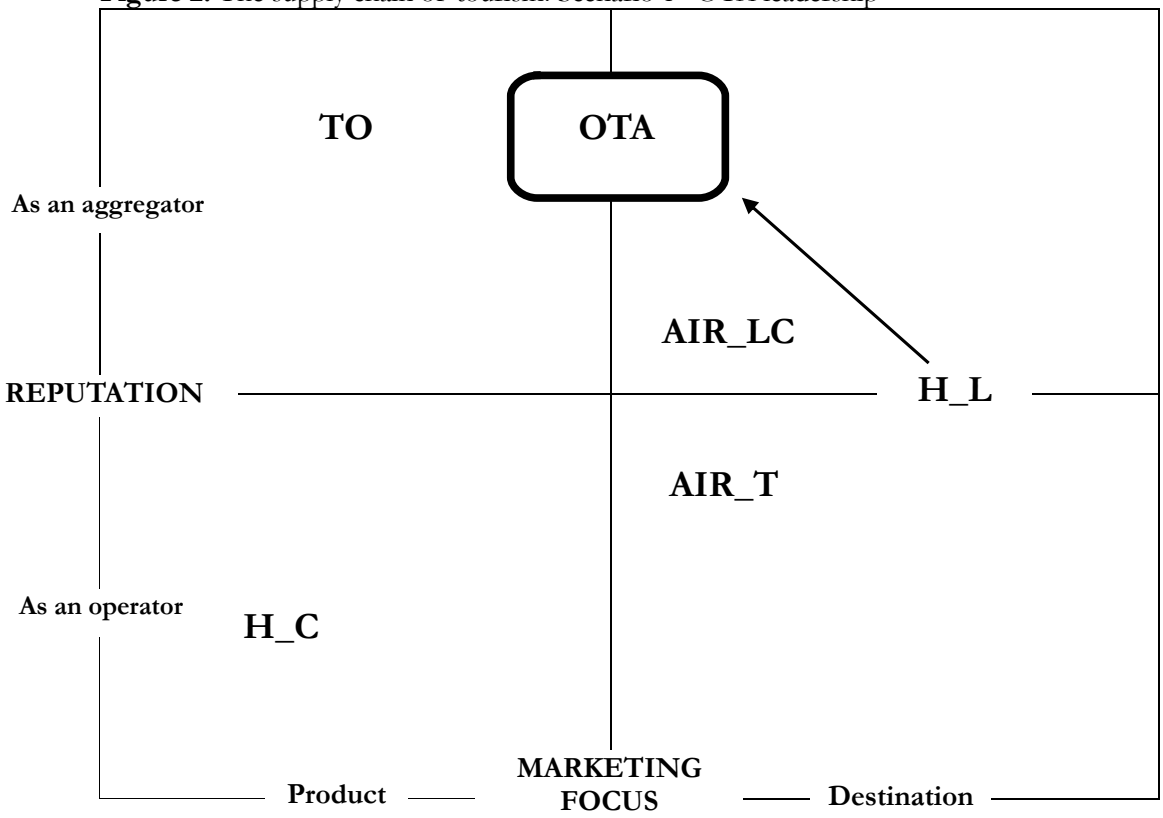
Thanks to their increasing capacity to develop and implement business intelligence strategies and technologies, OTAs are able to offer the specific product that is demanded by any individual tourist. This ability is twinned by a vertical (à la Uber) business model, that pushes independent hotels (and their destinations) in a subaltern position.

Other operators keep an autonomous position. Tour operators increase their focus on tourism products – in particular, on business tourism – thus contributing to reduce the commercial relevance of destinations. Air companies and hotel chains develop a twofold commercial strategy: they sell their services both to final clients and to (traditional and internet-based) brokers and aggregators.

The chart of the tourism supply chain changes consistently (Fig. 2). A dominant position arises: OTAs – that lightly shift their positioning towards the marketing focus on products – now lead the tourism supply chains, while local hotels are in a subaltern position, where they are no longer able to leverage their own reputation.

This scenario is the most probable according to interviewees, because it builds on current trends. OTAs can reach a dominant position in the tourism supply chain, also because other operators and public authorities seem not able to oppose any relevant strategie. It goes without saying that this is the most desired scenario by OTAs and the less desired one by local operators (and their destinations).

Figure 2. The supply chain of tourism: Scenario 1 "OTA leadership"



Scenario 2 – Alliance OTAs-DMOs

In this scenario public policies play a relevant role by aiming at three targets: limiting the market power of OTAs with a stricter regulation of their activities (e.g., new tax rules specifically designed for global internet platforms or new labor market rules that limit the diffusion of "à la Uber" workforce models); supporting the development of destination management systems and the evolution of local networks of public and private operators into more structured DMOs; regulating the access to destinations consistently with their long-term carrying capacity, thus increasing their environmental, economic and social sustainability.

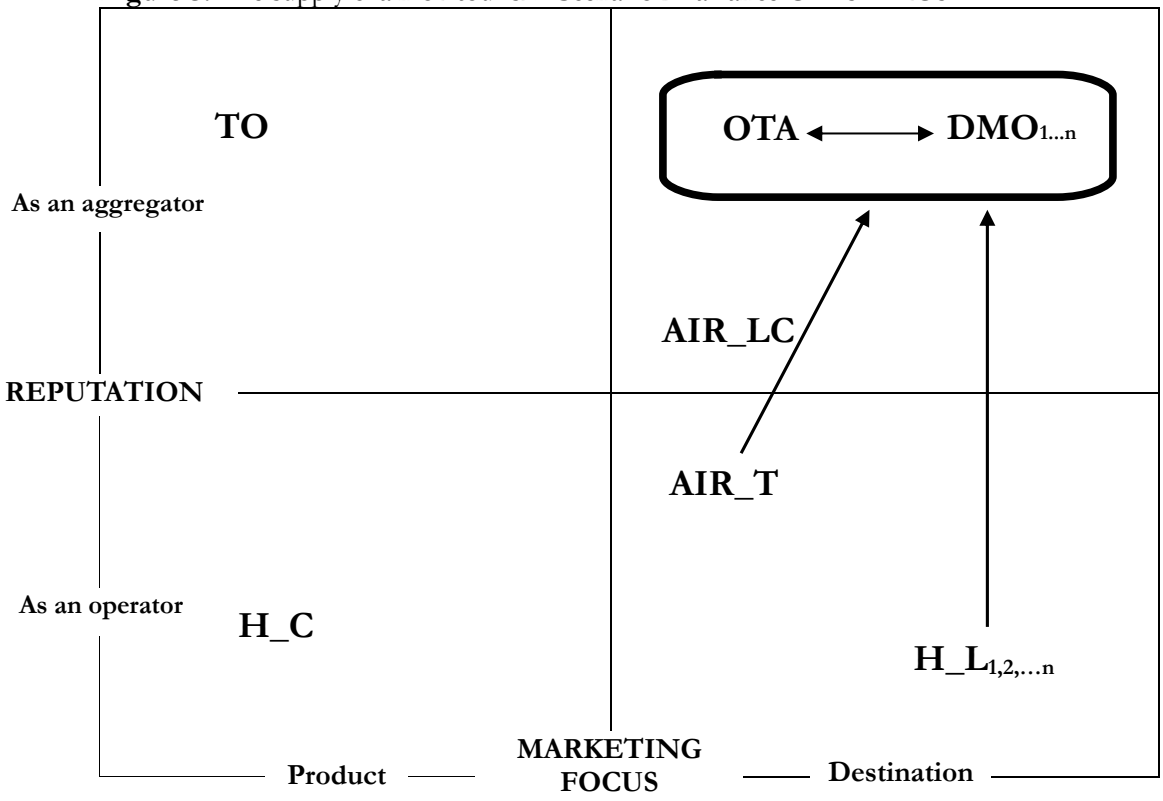
To keep their dominant position – and unlike scenario 1 – OTAs react to public policies by developing a horizontal business model based on a big number of strategic alliances with DMOs. On one side of these alliances, each DMO builds a network of local operators (mostly with local hotel and B&Bs) that – with the support of air companies – can market its own tourism packages, supported by a local brand. On the other side, OTAs offer their business intelligence ability and services to DMOs, with a twofold aim: the promotion of their tourism packages, and the management of the temporal and spatial distribution of arrivals.

Not all operators' strategies are centered on destinations. Tour operators and big hotel are focused on tourism products and operate with no relevant relation with OTAs.

Even in this scenario the tourism supply chain features a dominant position resulting from the tight strategic partnership between OTAs and DMOs (Fig. 3). The latter also develop other strategic relationships, where both local hotel and traditional air companies are in a subaltern position.

The emergence of this scenario strongly depends on the structuring of a powerful opposition to OTAs, supported by – possibly coordinated – public and private actions. A trend which is currently unlikely, also because many (mostly local) operators distrust the ability of public administrations to promote and support effective destination-based actions.

Figure 3. The supply chain of tourism: Scenario 2 "alliance OTAs-DMOs"



Scenario 3 – divergence product/destination

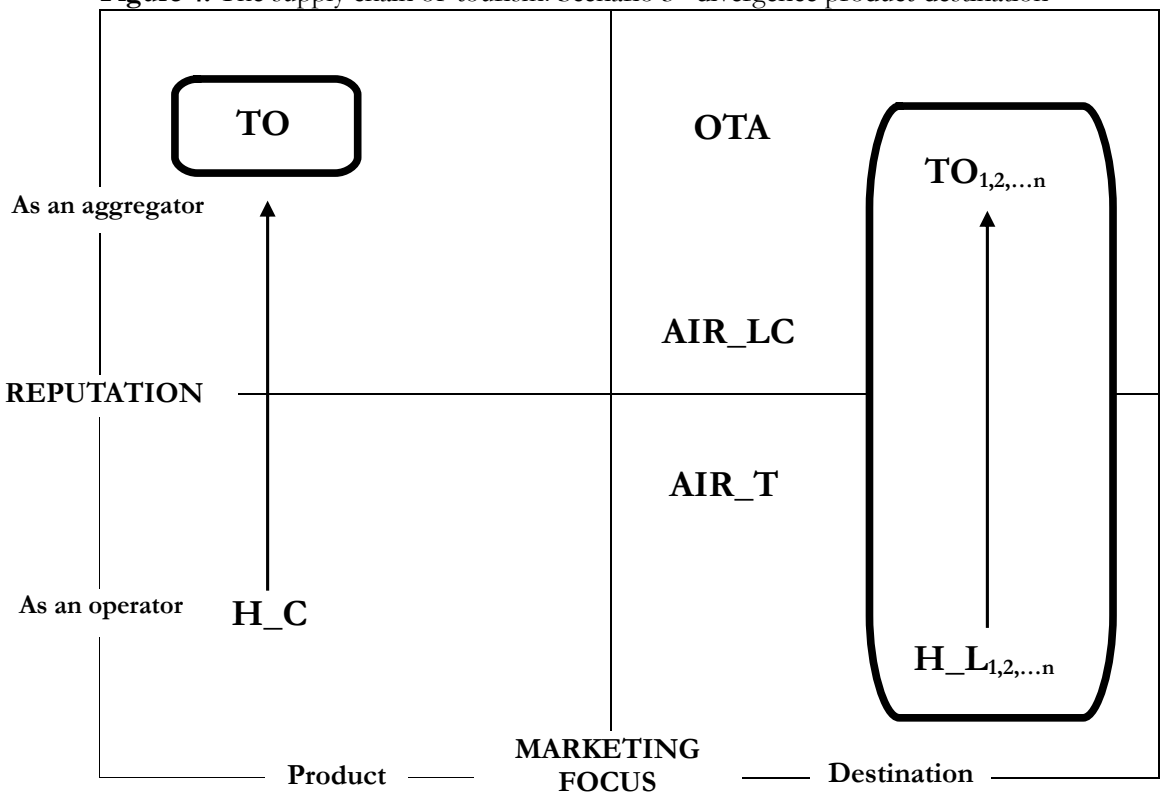
This is the only scenario where the tourism sector splits in two different systems. There is one global system – which is led by tour operators and centered on tourism products – and a plethora of much smaller local systems. Each of these destination-centered systems is led by an alliance between a tour operator which is specialized on a destination and its local hotels (including B&Bs).

The emergence of the global system is largely based on current trends, mostly on the increasing focus of both hotel chains and tour operators on tourism products.

On the contrary, local systems result from the structuring of a trend which is currently marginal: the creation of destination-based business intelligence abilities, possibly supported by ad-hoc public incentives leveraged by private finance operators. Because of this trend, destinations can build their own tourism packages, and sell them into the global market, possibly giving birth to local OTAs.

OTAs and air companies keep a relevant role, but without developing a strategic relationship with any of the existing tourism systems.

Figure 4. The supply chain of tourism: Scenario 3 "divergence product-destination"



The chart of this scenario clearly shows the existence of two dominant positions, centered on products and destinations, respectively (Fig. 4). In the first one, hotel chains are in a subaltern strategic relationship with tour operators; in the second one, local hotels and tour operators develop a cooperative strategic relationship.

Even if the marketing divergence between products and destinations is considered a realistic trend, this scenario is the less likely one among the three presented here. This mostly depends on the unrealistic assumption that a spontaneous initiative of (both global and local)

private operators should be strong enough to leave global OTAs in a non-dominant position. Likelihood may increase with the support of public initiatives and resources.

Some overall consideration on scenarios

As stressed by one of the interviewed operators (DT), the above scenarios may be considered not as alternative, but as the result of a single pathway starting from scenario 1 – where OTAs reach a dominant position – and then leading to scenario 2, where a number of public actions weaken OTAs, support DMOs, and pave the way to scenario 3, with DMOs turning into destination-centered TOs that compete with global – product-centered – TOs.

Scenarios may also be used as a basis for a discussion between local (both public and private) tourism actors: scenario 1 will emerge if local operators do nothing and remain subaltern to OTAs; scenario 2 may result from a public initiative that support the creation of DMOs that can interact with dominant OTAs on an equal basis; in scenario 3 the dominant position of OTAs is taken over also by local operators.

Moreover – and this is the opinion of another interviewed expert (MU) – a more important role should be assigned to low-fare air companies. These operators may leverage their current market power to co-operate with – or compete against – any other tourism operator aiming at a dominant position in the tourism supply chain. In this case, all scenarios should be modified accordingly.

5. Discussion and conclusions

In this paper, current and future trends of change of tourism are presented as the result of the reorganization of its supply chain. A specific attention is given to the entry of new actors – i.e., the internet-based tourism platforms such as AirBnB, Booking, Expedia, etc. – and to their disruptive impact on the dynamics of the relationships between actors along the tourism supply chain. It is precisely the entry of such new actors which is considered the most important on-going innovation of tourism, much more than the technology they bring along.

The approach presented here is original, if compared to the current ST literature on innovations and transitions.

First, here the reorganization of the supply chain is not just one of the effects of an innovation, but it is *the* innovation. What is radically changing tourism it is not the Web, but the entry of new internet-based actors. The Web was already pervasively used by traditional actors, with marginal impacts on the tourism supply chain (i.e., the add-on of ITC suppliers). Things radically changed when the new internet-based tourism actors started disrupting existing vertical relationships and – most important – started creating a brand-new tourism supply chain. Therefore, one must say that today – and more and more in the future – the innovation in tourism is not the Web, but the new supply chain emerging from the entry of new actors, and from the resulting battle for its leadership.

Second, it is the focus on the entry of new actors – and the resulting changes in supply chains – that allows to see in a new light the dynamics within and between networks of innovators. In the usual representation of a ST transition, cooperative relationships between innovators take place vertically along a supply chain to adapt to the emergence of innovative inputs; at the same time, competitive forces deploy horizontally between a network of

innovators defending the dominant position of their ST system, and one or more networks innovators (usually operating in a ST niche) that support the emerging alternatives. Within the approach proposed here, both competitive and cooperative forces mostly deploy vertically. Innovators from other industry enter the supply chain of an existing ST system to threaten (and possibly take over) its leadership; if considered in these terms, competition is a battle for the leadership of an existing supply chain. At the same time – and precisely with the aim of reaching a leading position – the entrant innovator must also build new cooperative relationships with other innovators operating along the same supply chain.

Third, this contribution can help to make explicit the reference to the supply chain that until now remained implicit in the seminal typology of ST transition pathways proposed by Geels and Schot (2007). In the "reconfiguration" pathway new suppliers bring along a "component-innovation" that must be adopted by the dominant actors of the existing ST system, who also must adjust the existing supply chain. The "de-alignment and re-alignment" pathway may be based on changes that take place when – because of an innovation – a supply chain must be first decomposed and then recomposed in a completely new way. Even the "technological substitution" pathway may be interpreted as a radical change of the supply chain: this would happen when new powerful entrants come from another sector and use the innovation they bring along to enter, disrupt and possibly take over an existing supply chain. It may sound trivial, but it is worth stressing that the entry of an actor – that leverages its dominant position in another industry – has a greater impact on an industry than a niche actor that must scale up an empowering strategy before threatening the current dominant position. This is an issue that is not adequately addressed by the ST literature: the relationships between dominant positions, each one referring to a different industry. An approach that focuses on powerful innovators that used to operate in an industry, enter another industry and disrupt its supply chain is instead relevant for many important industries. For example, most analysis of ST transitions in the transportation and agri-food sectors may be reconsidered to integrate the impact of powerful new entrants coming from other industries (e.g., from energy and pharmaceutical, respectively). Such an explicit multi-industry approach may also push the attention of researchers away from the envisioning of the future impacts of specific emerging technologies or capabilities (the Internet of Things, machine learning, big data analytics, artificial intelligence, etc.) to the more relevant analysis of the current ability of the internet-based big global players to use such technologies to enter one or more industries (such as, retail, entertainment, health, etc.) and disrupt their supply chains. Because of this change of perspective, one may also look at the emergence of some cross-industry dominant positions that may eventually lead to a dominant influence on the global economy (and even on the society) (Kim and Torneo, 2018).

Lastly, results of this paper may also help tourism scholars to approach the issue of sustainable tourism not only from the demand side (i.e., focusing on what can foster tourists to adopt a more responsible behavior), or from the supply side (i.e., focusing on what can foster tourism operators to implement a more sustainable productive structure). Indeed, as shown in Scenario 2, also a supply chain approach to sustainability may be adopted: specific public policies and private actions may help generating a supply chain that is more sustainable just because its leading actors decide to center its organization on destinations and on their long-term carrying capacity. Maybe more important, a "supply chain side" approach to sustainability might be applied to other sectors than tourism.

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Appendix

Table A.1 – List of the interviews quoted in Section 4

Code	Interviewee's field of expertise
BI	Academic - Economics
BR	Academic - Economics
DC	Academic - Management
DO	Academic - Geography
DT	Operator - Hotel
MO	Academic - Law
MU	Institutional - Management
PR	Institutional - Economics
PT	Institutional - Management
PZ	Academic - Economics
US	Academic - Management

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18/06 *Carmenr Aina, Daniela Sonedda,* "Investment in education and household consumption"

18/05 *Maria Gabriella Campolo, Antonino Di Pino, Edoardo Otranto*, "Reducing Bias in a Matching Estimation of Endogenous Treatment Effect"

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18/02 *Massimiliano Bratti, Maurizio Conti, Giovanni Sulis,* "Employment Protection, Temporary Contracts and Firm-provided Training: Evidence from Italy"

18/01 *Luca De Benedictis, Vania Licio, Anna Maria Pinna,* "The long-term effects of the historical Roman road network: Trade costs of Italian provinces"

17/11 *Massimo Del Gatto, Carlo S. Mastinu,* "A Huff model with heterogeneous retailers fits well in Southern Italy"

17/10 *Sara Calligaris, Massimo Del Gatto, Fadi Hassan, Gianmarco I.P. Ottaviano, Fabiano Schivardi,* "The Productivity Puzzle and Misallocation: an Italian Perspective"

17/09 *Michele Battisti, Filippo Belloc. Massimo Del Gatto,* "Technology-specific Production Functions"

17/08 *Oliviero A. Carboni, Giuseppe Medda*, "Do Investment and Innovation Boost Export? An Analysis on European Firms"

17/07 *Edoardo Otranto, Massimo Mucciardi,* "Clustering Space-Time Series: A Flexible STAR Approach"

17/06 *Simone Franceschini, Gerardo Ettore Marletto,* "The dynamics of social capital during public participation: new knowledge from an on-going monitoring"

17/05 *Luca G. Deidda, Ettore Panetti,* "Banks' Liquidity Management and Systemic Risk"

17/04 *Luca Frigau, Tiziana Medda, Vittorio Pelligra,* "From the Field to the Lab An Experiment on the Representativeness of Standard Laboratory Subjects"

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ISBN 9788868512132